

CLIMATE CHANGE

CONFERENCE
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED NINTH CONGRESS
SECOND SESSION
ON
CLIMATE CHANGE

APRIL 4, 2006



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CLIMATE CHANGE

TUESDAY, APRIL 4, 2006

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES
Washington, DC.

The committee met, pursuant to notice, at 9:55 a.m., in room SD-G50, Dirksen Senate Office Building, Hon. Pete V. Domenici, chairman, presiding.

OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Hello, everybody. I guess if one was planning a way to make something difficult, we would have planned it this way. It is going to be about as tough as possible to get this done in an orderly manner. Nonetheless, we want you to know we do appreciate it, and we're going to get the benefit of what is gathered here and what you have worked on, regardless on the—what intervenes and what causes us to have commotion because of us not being in control of the Senate. And we are not in control of that.

The Senate's going to have votes this afternoon. There's an appropriations markup, which takes six of our members. Other things are going to intervene regularly. And we are about as far from the floor as we can be, by just an accident of arrangement. So, that's going to mess things up a bit, too.

But I think what we'll do is just see what happens, and you bear with us. Okay? We'll try to follow our schedule.

I have some brief opening remarks, and then I'll yield to Senator Bingaman, and we'll move right along from there.

First, I want to take this opportunity to thank everyone who submitted comments on our white paper. We received more than 150 submissions, containing more than 500 individual documents. Our white paper is based on the Sense of the Senate Resolution adopted by the U.S. Senate shortly before it passed the Energy Policy Act of 2005. That resolution was not included in the conference report, but Senator Bingaman and I agreed that we would follow that resolution with the white paper in an attempt to identify a path forward on developing an approach to a mandatory-based mechanism.

The white paper proposed four questions: Who is regulated, and where? Should allowances be free or auctioned? Should a U.S. system allow trading with other cap-and-trade systems around the world? And should the U.S. cap-and-trade system be conditioned on comparable action by developing nations?

These, the response, both in terms of sheer numbers and breadth of input, is overwhelming. Most of those who submitted answers

were extremely generous with their time and ideas, for which we are extremely grateful. A number of responses were adamantly opposed to the imposition of mandatory controls on greenhouse gas emissions. Some expressed opposition, others offered suggestions about how to construct a mandatory program. Still others wholeheartedly supported a mandatory approach. A number of comments suggested an upstream approach to regulation. Others recommended regulating downstream, large emitters. And still others recommended a hybrid system that regulates at various points along the economic spectrum.

Responses to other questions were equally diverse. Some favor free allowances, to minimize any economic impacts, others favor the allowance auction approach. Some favored linking trading with other systems, and opposed linkage. With regard to comparable action by the developing world, some suggested waiting for such action by others, and some submitters urged that the United States move now, rather than wait, and believes that our imposition would encourage the development, in those nations, of similar or the same.

Obviously, I have simplified, dramatically, the range of responses. Many are very detailed and complex, and, in some instances, it was very hard to even summarize them, to be honest. But the range of responses to the questions supports my feeling, when we were discussing a possible amendment to the energy bill—I felt then, and I feel now, that designing and implementing a mandatory system will be very difficult, both politically and economically. Consensus will be a very difficult thing. But I also feel now, as I did then, that we need to start somewhere. And this conference is our starting point.

Special thanks go to those selected to participate today. Your comments illuminate the magnitude of the task faced by the committee, and, indeed, the task faced by the Congress, if it is to design a mandatory market-based greenhouse gas emission program that is fair to all affected and produces substantial greenhouse gas emission reductions that does no harm, does maximum harm to the—minimum harm to the economy and encourages the developing world to get on with their part of the effort.

I do not know where we will end up, but I do believe that a large number of our citizens are concerned about climate change and I think that Congress needs to explore ways to reduce our contribution to the greenhouse gases to the atmosphere.

With that, I ask Senator Bingaman to take his time and proceed as he sees fit.

Senator Bingaman.

**STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR
FROM NEW MEXICO**

Senator BINGAMAN. Thank you very much, Mr. Chairman. Thanks, first, to you for holding this conference. I think this is a very useful thing to be doing, and I echo your thanks to all of those who are participating and to all of those who have filed comments in response to the white paper that we issued. I think that the seriousness with which many of the respondents address the issues, I

think, is very heartening. It's obvious that this is a subject that many people feel is in need of attention.

Let me just take the rest of my few minutes here to call on Perry Lindstrom, who's with the Energy Information Agency. He, kindly, came over here to very briefly explain a chart that the Energy Information Administration prepared for us, entitled "Greenhouse Gas Emissions Flow 2004." When I finally took the time to look at that chart, I thought it was pretty useful. And so, I suggested that maybe Perry could come and briefly describe what's involved with the chart. I think copies have been made available to people.

And, Perry, why don't you go ahead and give us your short explanation, and then I think the chairman intends to go ahead with the statements.

Go ahead, Perry.

Mr. LINDSTROM. Thank you, Senator.

This is just a brief overview of what the emissions look like in the economy in 2004, which is the latest year for which we have complete data. As you see, petroleum is the largest single category, starting on the left here, which is the—kind of the input, or upstream, side. And then coal is the second largest, followed by natural gas. If you look down here, this "renewables" is mainly plastics and things of that nature that are burned at municipal solid-waste sites, things of that nature.

So, those four categories make the energy total—subtotal. And then, you add to that, for the CO₂ total, industrial process emissions, and that gives you the total CO₂ in the economy.

In addition to CO₂, there are other gases, such as methane, nitrous oxide, and some high GWP gases, which are more esoteric, things like sulphur hexafluoride, that are also used in our economy.

You move from there to the middle of the chart, this is where the conversion to electricity takes place. And you see that we have "direct emissions" here, which then are in the end-use sectors. And then, the conversion emissions, we allocate them out to the end-use sectors based on electricity sales.

A little more complex part of this chart was allocating methane and nitrous oxide and the other gases to the end-use sectors. We had to make some judgments as to where those other gases would go, and you can see, from looking at the "C" section, over to the far right, that many of those end up in the industrial sector, in terms of our end-use allocation.

There are some adjustments that are made under the United Nations Framework Convention on Climate Change. We add in the U.S. territories, and we—under that agreement, the international bunker fuels are removed from every country's inventory.

I should mention that we have a memorandum of understanding with the U.S. EPA, and we give the energy data to the U.S. EPA, and they submit it every April, around April 15, to the United Nations, and that's our official submission, in terms of the U.S. inventory of greenhouse gases.

That's basically it, in a nutshell, fairly straightforward. I can answer any questions, if you have them.

Senator BINGAMAN. Well, instead of me asking questions, maybe we'll have some as we go through the first panel here.

Mr. LINDSTROM. All right.

Senator BINGAMAN. Thank you very much, Mr. Chairman.

The CHAIRMAN. Well, Senator Bingaman, I think that was a very good way to start this day off. It's the best explanation I have seen of the whole summary of it—where it starts, how it changes, and where it comes out.

Now, with that, we're going to hold to the schedule, and we ask everybody to do their very best. We're going to go right around. Each one knows what they're going to be talking about. Each one has their mike.

And we're going to start with you, Ruth Shaw, Duke Energy Corporation.

STATEMENT OF RUTH SHAW, GROUP EXECUTIVE FOR PUBLIC POLICY AND PRESIDENT FOR DUKE NUCLEAR, DUKE ENERGY CORPORATION

Ms. SHAW. Thank you, Mr. Chairman.

I am Ruth Shaw, group executive for public policy, and president of Duke Nuclear, for Duke Energy Corporation. We appreciate the committee's initiative in holding this Climate Conference, and the opportunity to participate.

As the Nation's largest investor-owned utility with a diverse fuel mix and a commitment to sustainability, Duke Energy is considering plans for new nuclear generation, for new lower emission pulverized coal units, and for IGCC, with the ability to capture carbon, as well as other options, including improved efficiency.

The assets we are contemplating will serve our nearly 4 million electric customers across five States for 50 years or more, and will impact their electricity power—their electricity prices for at least that period of time. The investment required is many billions of dollars. Customers and shareholders need greater certainty about carbon constraints and costs as we make these significant decisions for our future.

Therefore, Duke Energy favors U.S. policy on climate change that, first, is mandatory, not voluntary; second, is economywide in its scope, sending consistent signals to all sectors in all regions; is market-based, with price transparency; promotes development and use of new technologies, which are essential long-term success; is simply to administer; provides price certainty; and begins now, becoming more stringent gradually over time. We think this can be achieved through a well-designed cap-and-trade program that applies upstream, effectively sending a price signal to all energy users, including a safety valve, and using allowance allocations to address economic impact.

A carbon tax could also be an effective approach, and we look forward to working with you on a greenhouse gas reduction program that can be part of a global solution.

The CHAIRMAN. Thank you very much.

Elizabeth Moler.

**STATEMENT OF ELIZABETH A. MOLER, EXECUTIVE VICE
PRESIDENT, GOVERNMENT AND ENVIRONMENTAL AFFAIRS
AND PUBLIC POLICY, EXELON CORPORATION**

Ms. MOLER. Good morning, Mr. Chairman and members of the committee.

I'm executive vice president of government and environmental affairs for Exelon Corporation, the Chicago-based utility company. Our chairman and CEO, John Rowe, serves as co-chair of the bipartisan National Commission on Energy Policy. We appreciate the committee's invitation to appear today, and, in particular, the recognition you have given to the NCEP report in the committee's white paper.

In my brief time this morning, I want to stress the need for a mandatory, comprehensive, and balanced national greenhouse gas program. Like Duke, Exelon believes the greenhouse program must be mandatory. There is compelling scientific evidence that global warming is both real and caused by human activity.

We advocate either a carbon tax, which has many advantages, particularly from an efficiency point of view, or a cap-and-trade system of the type recommended by the NCEP. It is critical that we start now. We need economic and regulatory certainty in order to invest in a low-carbon energy future. The committee has held hearings on climate-change issues for nearly 30 years. The first one was in 1978, when I was still on the staff. It's time to act.

Second, greenhouse gas regulation must be comprehensive. It must employ carbon intensity targets designed to slow, stop, and ultimately reverse greenhouse gas accumulation in the atmosphere. It must be a national program. It must be economywide, in order to be fair. And it should be upstream.

Finally, any cap-and-trade program must be balanced. It must include a safety valve and an allocation scheme designed to ensure that the costs do not outweigh the environmental benefits. Allowances should initially be allocated for free, to avoid undue economic burden to consumers, but, over time, they should be options. And, finally, any allowance program should not create windfalls or distort price signals to customers.

Thank you.

The CHAIRMAN. Thank you.

Now we're going to stand in recess and go vote. You're free to behave as you'd like.

[Laughter.]

[Recess from 10:06 to 10:26 a.m.]

The CHAIRMAN. Thank you very much. We will now proceed.

David Slump, please.

**STATEMENT OF DAVID SLUMP, GENERAL MANAGER, GLOBAL
MARKETING, GE ENERGY, GENERAL ELECTRIC COMPANY**

Mr. SLUMP. Chairman Domenici, Senator Bingaman, members of the committee, I am David Slump, general manager of global marketing for GE Energy. We thank you for this opportunity to speak.

GE supports congressional action now to start reducing greenhouse gas emissions. Any solution must include a market-based price for carbon and incentives to develop and deploy zero- and low-carbon-emitting technologies. Clean energy technologies cannot

reach their full potential unless and until energy choices reflect a forward price for carbon. Prolonging uncertainty on carbon in the United States delays and distorts technology decisions, particularly with respect to power generation where investment lives are 50 years or more.

Technology is the answer to this dual environmental and economic challenge. Development and deployment of new technologies cannot occur in a vacuum. Clear public policy is needed to accelerate continued development and deployment of high-efficiency natural gas, renewables, cleaner coal, next-generation nuclear, and advances in carbon capture and sequestration.

Coal must continue to be a significant part of our energy fuel mix in a carbon-constrained world, and IGCC is a way to burn coal cleaner. IGCC provides a very clear example of the economic distortion and technology deployment caused by the lack of a forward predictable price for carbon. IGCC is more expensive in initial capital cost, but becomes the most cost-effective coal options when carbon-capture and storage are valued. Absent a public policy that values carbon, IGCC is disadvantaged, as utilities must justify their decisions on a cost basis for rate recovery or financing.

Any U.S. sector subject to carbon constraint must be allowed to meet a portion of its obligations through offset projects, including in India and in China. Such linkages will lower U.S. costs, help maintain U.S. energy technology leadership, preserve U.S. jobs, and also revitalize U.S. leadership in science and engineering education. We stand ready to work with all stakeholders to assure that this issue is addressed in the most cost-effective manner possible.

Thank you.

The CHAIRMAN. Thank you very much.

Jeff Sterba.

**STATEMENT OF JEFF STERBA, CHAIRMAN, PRESIDENT,
AND CEO, PNM RESOURCES**

Mr. STERBA. Thank you, Mr. Chairman, Senator Bingaman, members of the committee.

I'm Jeff Sterba, chairman, president, and CEO of PNM Resources, an energy holding company headquartered in Albuquerque, New Mexico. We provide electric and gas service throughout the State of New Mexico, parts of Texas, and at the wholesale level throughout the Western United States, using coal, nuclear, wind, and natural gas.

At PNM Resources, we agree with the comments that have gone before us that we believe now is the time for a healthy debate, at the Federal level, on climate change, and support the move to a mandatory program.

Let me speak specifically on some of the design principles. I would suggest a climate program that, first, is economywide. There is no single carbon fuel or industry sector that causes a majority of carbon emissions and the low hanging fruit of carbon reductions are likely scattered throughout the economy. And only an economywide program will avail itself to those opportunities.

Second, it needs to place the focus on the real solution: technology, both the deployment of existing technology and energy effi-

ciency, but, more particularly, the funding of future low-carbon and carbon-free technology deployment.

Third, that utilizes market mechanisms such as a cap-and-trade program and other mechanisms that recognize the interrelationship between carbon reductions and economic vitality. So, I commend the notion of a carbon intensity measure as the one to work with, because it brings the two things together.

Fourth, that places the point of regulation as close to the end user as possible, for efficiency reasons, but recognizes the transactions costs when millions of users are involved. So, I would differ a bit with the previous speakers and recommend a hybrid system, where the point of regulation is at the plant level for coal, where you have just several thousand users, and upstream for petroleum and natural, where there are millions of users.

Fifth, that allocates to existing coal-fire-generation allowances of large major of their emission—of their current emissions. It could be reduced over a long-term timeframe.

Sixth, that incorporates a safety valve to manage the impact of a cap-and-trade system.

Seventh, that allows U.S. companies to invest internationally. And, last, that requires the United States to pursue multiple mechanisms, such as the AP6 Initiative, to encourage all major nations to commit in an appropriate way.

Thank you. I look forward to your questions.

The CHAIRMAN. Thank you very much.

Garth Edward.

STATEMENT OF GARTH EDWARD, TRADING MANAGER, ENVIRONMENTAL PRODUCTS, SHELL

Mr. EDWARD. Chairman, Senators, thank you for this opportunity.

I'm Garth Edward. I'm the manager for the environmental trading in the Shell group.

Shell shares the concern on climate change, and we believe that action should be taken in an equitable and an economically responsible way. Now, let me focus on the questions that you've tasked us with.

First of all, on the issue of the point of regulation, Shell believes that a downstream allocation approach delivers the best results. The entity that is regulated and has the allocation must be able to actually implement the technologies that reduce emissions. This means that generators in large industry, including refineries, should be covered in respect to their stationary source emissions. However, on the transport side, we believe that vehicle manufacturers may be in the best position to implement the technologies and choices that address mobile source emissions.

In terms of allocation approaches, we believe that grandfathering—by that, we mean the free allocation of allowances, based on historical emissions—may have a role to play at the start of a system, but we believe that a move towards auctioning is likely to become necessary, and that this will become more attractive to business if a transparent recycling of revenue can be achieved, especially one that minimizes the draw on any working capital.

In terms of linking with other international markets, both in developed and in developing countries, we believe this is necessary for environmental and economic reasons. However, careful thought has to be given to the interaction of existing emission markets.

Two final points, to wrap up. We understand the attraction of a price cap or a safety valve, but we believe that measures on the supply side may be a better way to protect competitiveness in this country. And we do note, of course, the benefits of including all six greenhouse gases, rather than just CO₂ alone. We believe that this can lead to significant cost savings and efficiencies.

Thank you very much, sir.

The CHAIRMAN. Thank you very much.

Now we're going to back up.

Michael Murray.

STATEMENT OF MICHAEL MURRAY, DIRECTOR, LEGISLATIVE POLICY, SEMPRA ENERGY

Mr. MURRAY. Thank you, Chairman Domenici and other Senators. I appreciate the opportunity to be here today and to participate on this very important issue.

Sempra is based in San Diego, California, and provides electricity, natural gas, and value-added products and services to over 29 million customers in the United States, Europe, Canada, Mexico, South America, and Asia.

In my brief comments today, I would like to focus on two points that I think we ought to talk about a little bit as we have the panel discussion.

The first is the need for a national program. We fully support your efforts here in developing a national program. We think broad sector participation is critical to the success of this. We are concerned about the patchwork of State regulatory programs that are going forward. There are over 20 States now that are considering some type of climate action programs, from registries to caps to performance-based standards. And we are concerned for companies like ours, that operate in multiple states, that we'll have different sets of regulations to comply with.

We also think that it should address issues of allowance allocations to assure companies are not significantly disadvantaged. This is the hybrid auction allowance approach.

And, finally, we think that the promotion of technological development will really be key and instrumental to driving the success of this program.

The second point is that we think any Federal program should recognize the actions of companies like Sempra, who have taken significant steps to reduce their overall carbon footprint. Examples of these include our major efforts in infrastructure of LNG facilities in the west coast and gulf coast to bring in clean supplies of natural gas to supplement our domestic supplies. Our clean generation fleet in the West, which is one of the cleanest combined-cycle gas fleets in the country, are significant energy-efficiency programs. We're very proud of the fact that, on our customer side, since 1990, we have reduced about 2½ million tons of CO₂ equipment from our customer reductions. This is about a 500 megawatt powerplant.

And, over the next 10 years, we hope to achieve about the same amount.

On our own facilities, we have an energy conservation strategy of 10 percent energy reduction per square foot by 2010.

On the renewables, Semptra's utilities are well on their way to meeting the renewable portfolio requirements of California, which is 20 percent.

And, finally, on voluntary registries, Semptra's utilities are a voluntary member of the California Climate Registry, which is efforts to determine GHG inventories and developing measuring metrics.

Thank you very much. And we look forward to working with you as you go forward in developing this important program.

The CHAIRMAN. Thank you very much.

Chris Hobson.

STATEMENT OF CHRIS HOBSON, SENIOR VICE PRESIDENT, RESEARCH AND ENVIRONMENTAL AFFAIRS, SOUTHERN COMPANY

Mr. HOBSON. Thank you, Mr. Chairman.

My name is Chris Hobson. I'm senior vice president of research and environmental affairs for Southern Company. And we very much appreciate being included in this conference today.

Southern Company operates 40,000 megawatts of coal, nuclear, natural gas, and hydroelectric generation capacity to serve 4 million customers in the Southeast. We believe that our Nation's efforts and resources ought to be committed to the development of new technologies to address climate change, rather than being focused on mandatory caps and taxes. Developing these low-CO₂-emitting technologies give us the opportunity to meet the challenges of climate change, and, at the same time, provide the energy for a growing economy.

In our service territory alone over the next 15 years, we anticipate the demand of 11,000 megawatts of new generating capacity and our company as being a leader in developing those technologies that will serve that demand.

We, along with DOE and Orlando Utilities, will be building an ITCC 285-megawatt plant in Orlando, Florida. We think that this technology, even though it's coal-based, would generate between 20 and 25 percent less CO₂ emissions than the current fleet of coal-fired powerplants. We have taken a leadership effort in FutureGen, which will develop a zero-emission powerplant that will deal with the issue of carbon capture and sequestration.

We're actively involved, in our own region, on the issue of CO₂ capture and sequestration with the Southeast Regional Carbon Sequestration Partnership. And we are also pursuing the construction of the new generation of nuclear powerplants, with our goal of having new nuclear capacity online by 2015 and 2016.

In our written comments, we address specific questions posed by the committee, and there are some important points I'd like to briefly make. One, the impact to the American consumers and our competitiveness must be addressed up front. This program should be economywide. Allowances should be allocated fully to emitters. And regulated entities should always have the opportunity to use offsets for compliance.

With those brief remarks, I look forward to any questions you might have.

The CHAIRMAN. Thank you very much.
Andy Ruben.

STATEMENT OF ANDY RUBEN, VICE PRESIDENT OF CORPORATE STRATEGY AND SUSTAINABILITY, WAL-MART STORES, INC.

Mr. RUBEN. Yes. Mr. Chairman, Senator Bingaman, and members of the committee, my name is Andrew Ruben. I am vice president of corporate strategy and sustainability for Wal-Mart Stores. On behalf of my CEO, Lee Scott, I would like to thank the committee for this very important conference and inviting Wal-Mart to participate.

In 2005, our CEO announced a vision for Wal-Mart that places sustainability at the core of our corporate mission. Lee Scott stated that environmental threats should be seen as Katrina in slow motion. Environmental threats are challenges for our business, just as they are for our communities, our associates, and our customers.

Mr. Scott noted that at the top of the list of such challenges was the fact that increasing greenhouse gases are contributing to climate-change and weather-related disasters. Wal-Mart is not—is waiting neither for further study nor for legal mandates to take strong action on climate change.

We'll eliminate 30 percent of the energy used by our stores. We have set our corporate goal of eventually being supplied by 100 percent renewable energy. We'll eliminate 25 percent of our solid waste in U.S. stores in the next 3 years as we approach a corporate goal of producing zero waste. We'll increase the efficiency of our truck fleet by 25 percent over the next 3 years, and we'll double that efficiency in the next 10.

Mr. Chairman, these are only a few of the steps that Wal-Mart is taking to reduce its own climate impact. But let me be clear, we believe this is good business. Through these strong actions, we are proving that reducing greenhouse gas emissions through innovation adds value to our shareholders and our customers. It's because we see climate as a critical social issue, and because we believe that greenhouse gases can be cost-effectively reduced throughout the economy, that Wal-Mart would accept a mandatory cap-and-trade system to control greenhouse gas emissions.

Finally, as the committee develops the details of such a program, we look forward to sharing what we've learned in the past 18 months. If properly incentivized, companies like Wal-Mart can drive innovation up the supply chain in passing those savings on to consumers.

A well-designed system would also encourage companies like Wal-Mart to help offset any negative impacts of climate regulation on those least able to afford it.

And, finally, in short, we hope to be part of the solution. We look forward to sharing with you in more detail the many ways that we could, and already are, using our position to drive positive change.

Thank you.

The CHAIRMAN. Thank you very much.

Now, with that, we have completed the first round of witnesses. And now we have, what, staff? How much time do we have for questions? Forty-five minutes for—to go around between us and talk with each other, among each other, and exchange views.

I'm going to start by asking Senator Bingaman if he would like to open with some questions. Senators, would you be ready to have questions, so we can stimulate some conversation?

Senator Bingaman.

Senator BINGAMAN. Thank you very much.

One of the key issues that we're trying to get at here and have heard a lot about is how to allocate emissions, or how to allocate permits to emit.

Let me ask Betsy Moler about Exelon's view on this. As I understand what you've submitted, you talk about, "The approach to allocation should evolve over time in order to acknowledge the different circumstances among existing electric generators, while also encouraging a transition to more efficient low-carbon generation over time." Could you describe what you have in mind there with this evolution of the allocation system?

Ms. MOLER. I will try, Senator Bingaman.

We would propose to start the allocation of allowances by giving away the vast majority of allowances for free, selling perhaps 10 percent, in order to mitigate the impact of the program on our economy. And we have endorsed a safety valve, as well, where DOE would sell allowances. Over time, we advocate auctioning more and more allowances in order to encourage the development of clean technologies and to increase the efficiency of the program.

We have suggested one innovation—what we think's an innovation in the program. We propose to give the allowances, not to the generators, but to the local utilities, and to require them to pass through the financial benefits of those allowances to retail customers. This is particularly important where we have a patchwork of State regulatory programs with some utilities on a cost-of-service basis, and some of them based on a market basis. Over 50 percent of our citizens in the United States are served by utilities that have restructured, so this is not a trivial consideration.

If you give free allowances to the generators, we think it'll disproportionately benefit consumers in States that have not restructured. So, we would give the allowances to the local distribution companies, the utilities, and then they would have to be purchased by the generators and by the fleet operators, or what have you, in order to actually implement the program.

Senator BINGAMAN. I didn't know if you wanted to have someone ask a question.

The CHAIRMAN. Yes.

Senator BINGAMAN. We might get Jeff Sterba's comment on that same set of issues, at some point here.

The CHAIRMAN. Jeff, do you have comment on that—on the comment that was made by Elizabeth Moler?

Mr. STERBA. I would generally agree with what Ms. Moler has expressed, in terms of, number one, allocating the vast majority of them to current users. I think—we serve both regulated and unregulated markets—I think it is a complexity to allocate them to the distribution company. The vast majority of coal units, which,

for our industry, is the real issue; 80 percent of the carbon emissions come from coal out of the electric utility industry—the vast majority of coal units are regulated. They’re in regulated rates. The benefit clearly must flow through to customers.

I’m not sure that that wrinkle that she’s throwing in is really worth the added risks and complications of doing it. But I do believe that they ought to be allocated to the users, because you’ve got to mitigate the impact on the ultimate consumer.

I also think that her argument that over time you should phase down the amount that’s allocated for free is a reasonable approach, over a long period—say, 40 or 50 years. So, on the margin for new resources, you’re providing the right kind of signal to get new clean, low-carbon- or no-carbon-emission technologies being deployed.

The CHAIRMAN. Thank you very much.

Anybody else want to comment on that?

[No response.]

The CHAIRMAN. All right.

Senator Alexander.

Senator ALEXANDER. Thank you, Mr. Chairman.

Perhaps you discussed this, but at—with General Electric I’m interested in your IGCC, your coal gasification that you purchased from Chevron, and took steps in Florida. And, as I understand it, there is a new facility in Ohio with AEP. What can you tell us about that progress, what about the technical challenges and obstacles that you see there, and when will it be completed?

Mr. SLUMP. Correct. GE acquired ChevronTexaco’s technology mainly because our customer base was, at the time, having to buy a license, as opposed to a standard powerplant, and integrate that. They wanted a standard powerplant solution with a single-point accountable provider. So, we announced a partnership with Bechtel, and we are in a position to provide a 630-megawatt standard plant. We’ve launched the FEED study, the front-end engineering study, with AEP for their site, as well as Cinergy. And the commercial operation date for these will begin in 2010 and beyond.

The CHAIRMAN. Senator Murkowski.

Senator MURKOWSKI. Mr. Chairman, I was struck, by listening to most of you, that you have all indicated an economywide regulatory program is needed for—just from the equity perspective, but then, similarly, the number of respondents that acknowledge that this is going to be tough to do.

Mr. Slump, I guess I’ll direct the question initially to you. What would the impacts to the economy be if we do impose the economywide program, as opposed to doing a more directed approach—say, for instance, directed towards the electricity sector? Singling out you, because you’ve got the vast majority of the greenhouse gases coming from that sector of the industry. We’re saying that, from an equity perspective, it makes sense to go economywide, but it’s going to be difficult. So, what would the effect be if we just focused, or we just began with a single sector?

Mr. SLUMP. We’ve proposed a third-party study to look at the economics and the tradeoffs of the various proposals. You know, the impact of the economy varies with the cap or the price of carbon. So, the comment we were making was just the 80/20 rule. If you

capture transportation and the utilities, you've captured a percent of it; and, initially, it may be easier to begin to implement, with less administrative burden.

Senator MURKOWSKI. Anybody else want to comment on that?

Mr. Hobson.

Mr. RUBEN. I'd add—

Senator MURKOWSKI. Mr. Ruben. I'm sorry.

Mr. RUBEN. I'd add one comment to that. I think there's a way to not only capture an efficient segment of the market, but, at the same time, leave enough available credits to reward those players who might be able—for example, a player like Wal-Mart, who can reach up and down a supply chain, both creating additional benefits, either up the supply chain, such as, for example, with a supplier we have in southern Georgia, and being able to incent that supplier to reduce their electrical needs by 60 percent, benefiting both our consumers and the prices, as well as reducing greenhouses gases, or reach down the supply chain and offer those same benefits to a customer, a technology like a compact fluorescent light bulb, that, just by increasing the penetration of a high-efficiency product like that, we're able, not only to share that benefit, but also—not only to reduce greenhouse gases—I'm sorry—but also share the economic benefit of using less energy, potentially mitigating some of the increased costs that we'd see, depending on the type of policy and regulation.

The CHAIRMAN. Mr. Sterba, would you comment on that?

Mr. STERBA. Mr. Chairman, Senator, I think the logic that was just given is the best logic for why it needs to be economywide. There are many things that can be done throughout the economy. And what you want to do is incent the lowest-cost initiatives that can be taken in the economy to reduce carbon dioxide emissions, whether it's on energy-efficiency, whether it's in the transportation sector, through the refinement of the efficiency of diesel engines, or whether it be in the production of electricity through a coal or a natural gas facility. That's the value of it being economywide, is, you can get the lowest-cost solutions, because they are everywhere within the economy.

The CHAIRMAN. Yes. I think I was going to Garth next. Excuse me.

Mr. EDWARD. Thanks, Senator.

A quick point. I mean, I think, all things being equal, the costs of compliance to the overall economy will be brought down, the wider the scope of the emissions trading system. I think that's true. It's just that the costs of implementation—the transaction costs, if you will, if we try and reach everybody, in terms of monitoring and verifying and enforcing—tend to outweigh the benefits at the margins. So, we've got to take a balance and go where we can achieve the best results in the quickest timeframe for the best transaction costs. And that tends to mean that we're going to focus on applying the regulation to those parts of the economy that actually deploy technology, change their capital investment plans, and so on. And that's why we favor a kind of—a downstream approach, in terms of stationary-source emissions, the power generating in large-industrial sector. But when we look at the transport sector, we do recognize that as a very important source of emissions, and one

that must be addressed, but the upstream approach may not best change emissions from the transport sector. When it comes to transport, the ability to change the emissions coming from the transport sector may best be done at the vehicle manufacturer's level, where the purchase of a car is probably one of the single biggest impacts on the emissions from the transport sector.

Thank you.

The CHAIRMAN. Now, Mr. Murray.

Mr. MURRAY. Thank you, Senator.

Senator Murkowski, I think we should consider that we do have a fair amount of experience when we look at the broader scope of trading, if you look at the criteria pollutant efforts that we've done, where we've been able to trade stationary versus mobile sources. The more robust you make the trading, the—and I agree with the earlier comment, that we will get the most efficient way of getting the reductions. And that's why I think the broader the participants in the market, if you will, the more opportunities we have to make these reductions.

We have a lot of history on criteria, stationary versus mobile trading, and we could look at that, and look at the successes and things that we've done, and be able to take from that, perhaps, for applying it to CO₂.

The CHAIRMAN. We want to let Senator Feinstein ask a question here before we run out of time.

Senator Feinstein.

Senator FEINSTEIN. Mr. Chairman, I'd like to make a brief statement, if I might.

The CHAIRMAN. Please.

**STATEMENT OF HON. DIANNE FEINSTEIN, U.S. SENATOR
FROM CALIFORNIA**

Senator FEINSTEIN. Let me just thank you for holding this hearing.

I can't help but notice that it's the most widely attended hearing that I think I've been to for this committee. And I think it shows the gravity of the situation. I also think it shows the need for action.

Now, California is going to take action. The Governor, last year, signed an executive order to reduce global-warming emissions by 25 percent by the year 2020. Yesterday, the speaker of the legislature and Assemblywoman Pavley introduced a bill that would require the California Air Resources Board to institute a mandatory emissions reporting and tracking system to monitor compliance with the emission limits. That would essentially reduce global warming by 145 million tons by 2020, or 25 percent below forecast emissions.

The State has taken action on automobiles. It'll probably be litigated. The attorney general says that the State can move ahead independently. We believe Canada will follow.

I think it is very critical that we take action.

I've put together a bill, which is really based on McCain-Lieberman, but adds more flexibility. And essentially what it does is caps companies' emissions at today's level from 2006 to 2010, then reduces emission .5 percent annually from 2011 to 2015, and

then 1 percent annually from 2016 to 2020. It would require companies to cut overall emissions 7.25 percent from today's levels by 2020. Now, that's equal to 400 million metric tons of CO₂ by 2020. What's interesting is that California's cut would be 145 million metric tons. That's about a third of what a 7½-percent reduction nationally would mean. I think what that points out is really the unique wisdom of taking national action.

Now, I'd like to make my bill available to anyone who would like to look at it and comment on it prior to our introduction of it, so all you have to do is let us know your thoughts. But I'd like to ask this question.

Ms. Moler mentioned the issue of the auction. The auction is disputed between business and the environmentalists. The environmentalists want an auction. Most businesses say, "Hold off." The proceeds of the auction would go, obviously, to fund new technology.

My question of you, if I might, is—you have said, "Over time, an auction"—and I'd like to ask you to expand on that. You and others, as well—commented on the role of an auction if you did have a mandatory cap-and-trade system. Our system includes carbon sequestration and agriculture, providing credits for that, so that there is incentive for agriculture to get involved, as well—we've left the question of the auction open, and I'd like to have comments from the panel on when you believe an auction should come into play, how many years hence, and what the rationale for that time delay would be.

Ms. MOLER. We would start an auction in, say, the year 2009-2010. Initially, the vast majority of allowances, we would give away for free, if you will, and have a small portion of the allowances subject to auction, 10 percent—90/10 is what we have proposed—and then, over a period of time—and it's, frankly, pretty arbitrary, but—how quickly you ramp up the auction really depends on how much you think the economy can handle the cost. But over a period of time, we would invert it, so that you eventually have all of the mission allowances auctioned. And we would take the money and put it in a sequestered off-budget fund for technology development.

Senator FEINSTEIN. Thank you. That's very helpful. Anybody else?

Ms. Shaw.

Ms. SHAW. We, basically, would endorse the approach that Ms. Moler has described. But I would add to that the—your comment about the wisdom of a national approach is essential. And that's one reason I really applaud the work of this committee. As laudable as some of the efforts are on a State-by-State or regional basis, they make it extremely difficult for us to achieve the end goals.

Senator FEINSTEIN. Anybody else, on the auction question?

Yes, sir?

Mr. EDWARD. The advantages of auctioning, in particular, are that they promote the entry of new entrants, or new efficient players, let's say, in the power generation market or the industrial market, over time. It also deals very well with exit or closures of installations from an emissions trading system. Auctioning has many benefits, just in terms of the operation of an emissions trad-

ing system, and, from economic-theory points of view, is good benefit to do with equity, and so on.

The problem may arise, though, when companies come new to an auctioning system that auctions, let's say, 100 percent or a large majority of the allowances from the get-go, and that means that those companies are having to pay a great deal in order to get the allowances that effectively form their license to operate. And that initial payment to get those allowances can be a huge dent, in terms of cash flow or working capital. And so, there are difficulties there, from a business point of view.

The way that auctioning may deal with that is by recycling part of that revenue, either through the tax system or back in some way. But some of those issues need to be dealt with.

Senator FEINSTEIN. You're advocating recycling the auction proceeds, partially, back to the businesses that are participating, in addition to the technology. So, in other words, in a certain ratio? And what would that ratio be?

Mr. EDWARD. Well, I don't think we have any precise views about the ratio. I think it's the principle that the cash-flow impact to companies has to be addressed. And I think there are various ways to do that. Probably can explore them further. But that's a concern, initially, from a business point of view. Recognize the benefits of auctioning from a system point of view has a lot of benefits in the long term, but how to get it up and running at the start without seriously hurting companies from a cash-flow point of view.

Senator FEINSTEIN. Well, let me just ask, does anybody disagree with what Mrs. Moler said about holding an auction to 2009 or 2010, and then doing it on a 90/10 basis? Is there any disagreement with that?

The CHAIRMAN. There's one.

Senator FEINSTEIN. Mr. Hobson.

Mr. HOBSON. I don't think that we necessarily disagree. I think the auction program under the SO₂ program has worked reasonably well. I think where we might part company is, what does the future detail of that auction look like? Does it stay constant? It's that ramping down that can generate real problems for emitters in the future. And so, I think the concept of an auction, with a small percentage of allowances being auctioned, is not a bad idea. But I think it's the ramp that becomes—

Senator FEINSTEIN. Mr. Sterba, did you have—

The CHAIRMAN. Senator, I think we're going to get on with the next one.

Senator FEINSTEIN. All right.

The CHAIRMAN. Senator Menendez.

All right. I'm going to pose a proposition here. I'm listening to all of you, and it seems like Chris Hobson—Southern Company's statement is a little different than most of yours.

[Laughter.]

The CHAIRMAN. Is that a fair assessment? And I don't think he's embarrassed at my saying that.

Mr. HOBSON. No.

The CHAIRMAN. I gather that Southern Company, a very reputable, strong company in the United States, is saying they're going to get there a different way. They're going to stop emitting

carbon into the atmosphere, but they're going to do it with technology changes in the makeup of that which they use to generate electricity. Am I correct that that's what you say you're going to do, and that you would explain to us, at this forum, how that's going to happen?

Mr. HOBSON. Yes, Senator. The items I articulated, such as FutureGen, the building of an ITCC, the development of new nuclear, are all technologies that will ultimately get us where we want to be, in terms of addressing CO₂ emissions. And I point those out to highlight the fact that, even in the absence of a mandatory program, there are substantial efforts underway to bring these technologies to the point of deployment.

The CHAIRMAN. Yes.

Mr. HOBSON. And a mandatory program, in our view, is not necessary to make that happen.

The CHAIRMAN. Now, Chris, I did not bring you—bring that up, and your name up, and your company's, any way other than because it is a bona fide approach, and it's out there, and the American people understand it, and your constituents understand it. And I think it ought to be talked about here. What's wrong with what they're saying? And what should we be doing to make sure that more of what they say is going to happen, happens? I'd just throw that before you for a few minutes of discussion.

Jeff, did you have your hand up? Then we'll come to you, Ruth.

Mr. STERBA. Mr. Chairman, I'm glad you put this question out there. I really think it's more an issue of form than substance. There is no way that we can accomplish what needs to be done on greenhouse gases without technology. It is the only answer that we really have. So, I think all of us would agree with the statement that Chris has made that technology is the driver. And some of the technology exists today, but much of it does not. And that's the big investment gap that we have to bridge.

So, the question then becomes: Well, how do you move this ball forward? And is there low-cost reductions to carbon that could occur with a mandatory system, that may not occur without it? And for, I think, us in the utility industry, whether you make it mandatory or it stays voluntarily—voluntary, there's an awful lot of things we're going to stay focused on, in trying to reduce greenhouse gases, because we see the call for that.

But I think in other sectors, in other areas, that may happen a lot more slowly if it remain solely voluntary, where it's much more dispersed, in terms of the obligation or the—I'm sorry, the cause of the emissions of carbon dioxide.

So, that's where I think the—it—the difference really is how we get there, not, what is it going to take, in terms of technology? I think we all agree, that's the only solution we have.

The CHAIRMAN. Yes, Ruth.

Ms. SHAW. And, essentially, I would echo Jeff. I think the difference is more one of timing. We, too, are committed to advances in technology. But there are very significant regional differences. For example, even though we're looking at IGCC in the Carolinas, among the States that we serve, carbon sequestration is not possible, because of the geology. Some of the technologies that are available today and emit no greenhouse gases, including nuclear,

face significant barriers to future construction, of which this committee is well aware. And financial investments will not be made until some of those issues are resolved.

We simply believe that we cannot delay, and cannot count on a strictly voluntary approach if we're going to move forward on this action. We also believe the United States cannot be alone in the world, in terms of acting on these issues.

The CHAIRMAN. What was the last statement?

Ms. SHAW. We believe the United States must act, must be part of the global community in acting on these issues.

The CHAIRMAN. Right.

Andy Ruben, from Wal-Mart?

Mr. RUBEN. Yes, thank you, Senator.

It's a very good question you've posed, and I think we agree with the last statements that are made. And it really—for us, we see it one of timing, of how fast things move, and what market forces come into play with a system like we're talking about, or some type of policy.

The initiatives and the actions that we are taking, we're going to take anyway—again, because we believe they're good business. But the timing of those, the aggressiveness, will change, based on what type of policy is set up in a U.S. system such as we're talking about.

And just a quick example, LED lighting is a much more efficient lighting technology that we are—that we have just rolled out in all the signage programs in the front of the our stores.

Now, we're currently working, because we know it will save 50 percent of the energy, even over an efficient T8 light, in our freezer coolers. That, right now—we work every day to find better ways to roll that out faster. But some type of policy, a policy that rewards that kind of innovation, will accelerate the pace of those type of opportunities.

The CHAIRMAN. Very good point.

Mr. Murray.

Mr. MURRAY. Yes, thank you, Senator.

I think another thing we should always consider when we're looking at this is the energy efficiency aspect. And I think California has been a leader in energy efficiency, and just the information exchange with the other States, I think, is important, to look at technology development and what we've done out there, and to share that with others, and basically put these programs in place. You can get a lot of megawatt reductions with energy efficiency. And this is particularly important in the Southwest, where we have such huge growth, when you think about it, where California is growing at a rate of about 600,000 people a year, which is about 1,000 megawatts of new power that's needed every year. That's two 500-megawatt powerplants that are needed just for the new people coming into California. So, just to keep up with that demand in the West and the Southwest, we're going to have to institute these kind of programs.

The CHAIRMAN. Okay.

Yes, David?

Mr. SLUMP. GE believes, as with others here, that technology is the key. But to accelerate technology, a forward and predictable price for carbon must be used.

If you look around the world—China will add 170 gigawatts of new capacity by 2020; the United States and Western Europe, 100 gigawatts; India, 60 gigawatts—you have to do this through fuel diversity. You will need coal, you will need nuclear, you will need renewables. So, the only way to put that into that investment choice is to value carbon equally.

Where there are markets, such as India—2 weeks ago, we were in India and launched a rural electrification program. For years, people have been trying to do rural electrification in India. You know, over 400 million people have no power. And because of the Clean Development Mechanism, we were able to deploy 24 megawatts of biomass gas receps. The government of India has reduced tariffs for clean energy technologies from 15 to 5 percent. We're working with the local governments. It'll provide 4,000 new jobs. And I think the point is, technology innovation and commercial innovation are linked, but you need a market price to drive it.

The CHAIRMAN. Senator Bingaman.

Senator BINGAMAN. Let me just ask—David, you say because of the clean technology mechanism?

Mr. SLUMP. Sorry. CDM, Clean Development Mechanism.

Senator BINGAMAN. The Clean Development Mechanism. And that is a mechanism that's set up in the EU trading system. So, what I understand is that because of the financial benefit to GE in the European trading system, you are able to make this investment in reduction of energy use in India. Is that correct?

Mr. SLUMP. Partly. Actually, the way we did this is, the developer we're working with needed it for the pro forma to go forward, so we partnered him with PriceWaterhouse to do the exchange, but we got our standard margins and payment terms on importing the engines to India. I think India is the number one market for CDM in the world right now, twice as big; and number two, Brazil. And it's just a point that—where you have market mechanisms, maybe not perfect, you get some traction.

Senator BINGAMAN. Okay. I was going to ask one other question of Garth. You had said in your testimony, that Shell favors measures on the supply side, rather than a safety valve, in any kind of a cap-and-trade system. Could you describe or elaborate on that a little bit? I'm not clear exactly what you mean.

Mr. EDWARD. Well, I guess the concern with a safety valve or a price cap is to ensure the competitiveness of industries in the United States. And there are, maybe, different ways of doing that. A price cap can be difficult to maintain in markets, especially markets that have interaction with the international community. And we don't have price caps in the rest of the energy complex. And so, there can be difficulties in trying to introduce a price cap in this part of the market. But if we are concerned about ensuring competitiveness, rather than capping prices, per se, then there are, maybe, ways of doing that, and one of those ways if by supply-side actions, being able to increase the supply of allowances as competitiveness is challenged, or if competitiveness is challenged. And so,

that's just one way of meeting the competitiveness objective without necessarily interfering directly in the market.

Senator BINGAMAN. So, when you say "on the supply side," you're talking about the supply side of allowances. Is that it?

Mr. EDWARD. That's exactly it. There may be various sources of supply. The supply of allowances issued by the Government is one. Access to international markets is another. The possibility to have access to new and additional sources of offsets within the domestic economy is another.

Senator BINGAMAN. You talk about an open architecture approach that encourages a global carbon market through linking with other systems. And that's what you're talking about there?

Mr. EDWARD. That would be part of the equation. But if we just hold it domestically for a second, the—an increased supply of allowances from the Government is one possibility, but, also, increased access to offsets that are domestically generated is also another possible source of supply.

Senator BINGAMAN. Thank you.

The CHAIRMAN. All right. I think we're a bit early. We haven't used our full 45 minutes, but we're—I think we're going to finish this panel, if you don't mind, and move to the next one.

Thank you all very much.

The next panel, please?

[Recess from 11:15 to 11:16.]

The CHAIRMAN. Thank you very much. Very, very good exchange.

We're going to get started, and, if it works, by 12:30 or so, we'll be out for lunch, until our 2:30 meeting.

We're going to start right now, over on our left. Margo, are you about ready? You're first. And turn on your mike and give us your 2 minutes. We look forward to hearing from you.

**STATEMENT OF MARGO THORNING, SENIOR VICE PRESIDENT
AND CHIEF ECONOMIST, AMERICAN COUNCIL FOR CAPITAL
FORMATION**

Dr. THORNING. Thank you very much for the opportunity to appear before this very important hearing.

I'd like to take my time to compare, briefly, the pros and cons of a cap-and-trade approach to reducing greenhouse gas emissions to one based on a voluntary approach.

In the European Union, the emission trading system is not working very well. Their environmental agencies shows that they'll be 4 percent above their 1990 targets in 2010, not 8 percent below. Companies have been faced with higher energy prices—in part, due to their emission trading system.

A cap-and-trade system will not provide the investors certainty or drive the technology that's needed to reduce greenhouse gas emissions. Caps such as those proposed by policymakers in Washington are just the first step. As many of us know, the call is to reduce greenhouse gas emissions 60 to 80 percent by 2050. So, a small first step is just the beginning of additional reductions, which increase uncertainty for investors. Furthermore, unlike EU firms, U.S. firms would be compelled to comply with emission reduction targets. They would have to meet these targets or be shut down; whereas, the EU has a more flexible system that will allow contin-

ued production. Caps would also increase electricity prices, reduce economic growth, and reduce the uncertainty about the return that could be expected on investment. Furthermore, they won't drive the technology that'll be needed, because of the fact that a current government can't bind a future government as to prices that will be in effect as a safety-valve price or for the targets that would be in place.

So, I think a focus on the administration's approach, which is based on voluntary approach and a strong drive for new technology to reduce greenhouse gases, is the most efficient way to go forward. EIA data shows that a high-tech scenario reduces emissions, reduces electricity prices, and increases GDP, compared to a mandatory reduction in greenhouse gas emission intensity.

Finally, reforming the U.S. tax code to reduce the cost of capital for new investment by increasing depreciation allowances for energy investments could pull through the cleaner, more efficient technologies that we need, and reliance on mechanisms like the Asia-Pacific Partnership to transfer technology to developing countries can also be a strong factor in global greenhouse gas reductions.

Thank you.

The CHAIRMAN. Would you repeat the last statement, regarding foreign investment, please?

Dr. THORNING. The Asia-Pacific Partnership, which is focused on development—economic development and on technology transfer to countries like India and China, can have a very strong impact on reducing global greenhouse gas emissions.

The CHAIRMAN. Thank you.

Mr. Helme.

STATEMENT OF NED HELME, PRESIDENT, CENTER FOR CLEAN AIR POLICY

Mr. HELME. Thank you, Senator. It's a pleasure to be here this morning.

I'm Ned Helme. I'm the president of the Center for Clean Air Policy. It's an environmental think tank based here in Washington, and also in Brussels and in Toronto. We were the principal consultants for the European Commission in the design of their emissions trading program that, as you know, is up and running, and we've worked a lot, Senator Feinstein, with Governor Schwarzenegger and with the folks in California, on the design of the California program, and also with the Governments of India, China, Brazil, and Mexico, on the designs of their programs to move on climate change and reduction of greenhouse gases.

I've got five points I want to make this morning:

First, we strongly favor an economywide approach and a mandatory approach, as you've heard from other speakers, and for the same reasons.

Second, in terms of point of regulation, we would favor a hybrid approach, as Jeff Sterba outlined to you; basically, one which would put the six or seven major industrial sectors and the electric generators as points of regulation, along with natural gas distribution companies and oil refiners. That way, you get the advantages of capturing the small sources, like residential and commercial trans-

portation through the upstream, and you get the advantage of going after the major industrial point sources, where they really have an ability to identify good opportunities for emission reduction if they're regulated directly.

As a footnote to that, it's not a problem, in terms of the number of sources that we'd regulate. If you went on a hybrid, it would take about 8400 sources in the United States would be regulated, less than are currently regulated in the European Commission system. If you went upstream, it would be about 2,000 sources. So, clearly workable, from a technical point of view.

In terms of allocation, we favor the auction, as was discussed. One point I want to add is that the auction, if you recycle the revenues in the form of tax reductions, reduces the total societal cost of the program significantly, so you're going to have a cheaper program for society if you go that route. I would agree with Betsy Moler that it makes sense to start the auction slowly.

What we found—we did a study with Charles River Associates, looking at this, and found that it would take about 9 percent of the allowances to hold the shareholders harmless of the major corporations that are involved in this—a little more for coal, probably 35 percent; a little more for utilities—but it's doable. So, you have plenty of allowances left for other purposes, and we would favor some tax relief and also technology innovation, using the allowances as an incentive for companies to develop new technologies that wouldn't happen under the kinds of caps we're probably able to pass, legislatively, in the near term. So, I think the combination of setting aside a pool of allowances, letting companies compete for those allowances if they're going to do coal gasification sequestration, if they're going to do advanced nuclear, if they're going to do advanced wind technology, much like California now does for their renewables program. The company that asks for the fewest allowances to do that technology gets the award. And I think it's a great way to create competition for pushing these new technologies that we need. We aren't going to get it with the kind of caps we can do in the near term. We need additional incentives to get those new technologies.

Thank you very much.

The CHAIRMAN. Thank you very much, Ned.

Donald, we're looking forward to hearing from you, please.

**STATEMENT OF DONALD MARRON, ACTING DIRECTOR,
CONGRESSIONAL BUDGET OFFICE**

Mr. MARRON. Great, thank you, Mr. Chairman.

I'm Donald Marron, Acting Director of the Congressional Budget Office. Thank you for inviting CBO to participate in today's conference.

In keeping with CBO's mission, my comments will focus on the key economic issues that arise in designing a cap-and-trade system, but do not actually make any specific policy recommendations.

In response to the first question, "who is regulated, and where?" we agree with many of the previous panelists, that an economywide approach would be the most economically efficient, and that administrative costs would probably be minimized in an upstream approach. An important limitation of a purely upstream approach,

however, is that, in itself, it doesn't provide any incentives for emissions capture or emissions sequestration.

In response to the second question, the allocation of emission allowances, really, the key issue there is that the emissions potentially might have a significant amount of value, and that Congress has to make choices about who's going to receive that value.

There are three basic options that we've heard about. The first option would be to sell the allowances, and then use the resulting proceeds to reduce distortionary taxes. I think economists are generally in agreement that that approach has the overall greatest economic benefit, and that minimizes the overall economic burden that would be placed in the economy from the regulations. However, it would also do nothing to directly offset the burdens that would be placed on affected producers and consumers.

A second option would be to sell the allowances and then use the proceeds to finance R&D adaptation efforts, things like that. Such efforts may be valuable, but it turns out there's very little economic rationale for linking expenditures on them directly to the revenues that come from the allowance auctions, or selling the auctions—selling the allowances.

A third option would be to allocate allowances to offset some of the costs that are borne by producers and consumers by the introduction of the regulations. Unfortunately, identifying who actually bears those costs would be extremely difficult. Market forces, not the identity of the regulated parties, will ultimately determine who bears the costs. Consumers would pay higher prices. Some companies would earn lower profits. Some workers would earn lower wages. Indeed, even the Government would bear costs through higher prices. Each of those groups might have a reasonable claim for some allocated allowances. At the same time, there will also be some winners. Some companies, for example, would actually have higher profits because of the introduction of the regulations. Sorting through those impacts to determine an appropriate allocation of allowances would be very challenging.

Thank you.

Senator BINGAMAN [presiding]. I think the chairman intended we just go right ahead.

Richard, why don't you tell us EPRI's point of view?

**STATEMENT OF RICHARD RICHEL, TECHNICAL EXECUTIVE
FOR GLOBAL CLIMATE CHANGE RESEARCH, ELECTRIC
POWER RESEARCH INSTITUTE**

Dr. RICHEL. Thank you very much, Senator.

Good morning. My name is Richard Richels. I'm technical executive for global climate change research at the Electric Power Research Institute, in Palo Alto, California, Senator.

EPRI is a not-for-profit public-interest organization conducting research on issues of critical importance to the electric power industry. I will highlight five points from our written submission.

One, economic efficiency—that is, achieving our environmental goals at least cost—is critically important. Climate policy will have costs. The difference between an efficient and inefficient system can be at the order of hundreds of billions of dollars, and can determine the very success of a program.

Two, technology advances are central to controlling the cost of addressing climate change. The value of near-term policies will ultimately be judged by how effectively they create technology innovation.

Three, a cap-and-trade system should have as broad a coverage as possible in order to reduce emissions where it is cheapest to do so, and to provide the framework for an efficient, long-term transformation of the economy. This is true both domestically and internationally. Stabilization of atmospheric concentrations cannot be achieved without the active involvement of both developed and developing countries.

Four, the point of regulation is not important, from the standpoint of economic efficiency, as long as coverage is the same, but very important in determining administrative feasibility, complexity, and costs.

And, five, the allocation of permits is unlikely to affect the net costs of a policy significantly. However, it can greatly impact different households, companies, and regions of the country. The issue of who pays is a question of equity and a matter for the political process.

Thank you for the opportunity to share some of the insights from our research with you. I look forward to your questions.

The CHAIRMAN [presiding]. Thank you very much for your comments.

Now we're going to move to Jason—how do you say your last name?

Mr. GRUMET. Mr. Chairman, it's Grumet.

The CHAIRMAN. Grumet.

**STATEMENT OF JASON GRUMET, EXECUTIVE DIRECTOR,
NATIONAL COMMISSION ON ENERGY POLICY**

Mr. GRUMET. Thank you, Mr. Chairman, Senator Bingaman, and Senators Murkowski and Feinstein, for the opportunity to be here today on behalf of the National Commission on Energy Policy.

I'd like to start with a general reflection, and then make a couple of specific points.

At the outset, I think it's worth trying to distinguish between the basic notion of the costs to society of a program, and the equity issues, which I think are really the focus of today's discussion. And just to illustrate, from a question of overall societal costs, the proposal by the Energy Commission, in essence, seeks to reduce emissions by about a percent a year. The EIA concludes that the costs of that, the costs of the control technologies to achieve those reductions, would be somewhere between \$1 and \$4 billion a year, and, on the basis of that conclusion, reaches the ultimate conclusion, which I like to repeat daily, that our proposal would have no material effect on economic growth.

Now, equity considerations are critically important, but rather different. Equity considerations are essentially the question of, how do we divide up the 99 percent of permissible emissions among the various stakeholders in society? And that's what you have to do at the outset of a market-based program. The beauty of a market-based program is, then the market itself decides the most efficient way to achieve those reductions. But these questions are of critical

importance, from fairness, equity, and, ultimately, political viability.

But I guess I want to stress, at the outset, that it is possible to have a meaningful step towards reducing greenhouse gas emissions that meets with the Sense of the Senate obligation not to undermine the economy here in the United States.

On specifics, just for a moment, out of the 150 or so truly excellent submissions, of course, someone raised every different possible point. But I'm encouraged that there do seem to be some centers of gravity forming. I believe there is a general preference for an economywide program and an appreciation that to achieve that, administratively, you would have to move upstream in the energy food chain, either all the way upstream or—hybrid, in my book, is all basically upstream. NCEP believes that it's important that allocations are used to mitigate the costs of the program on those who bear those costs. We agree with the Center for Clean Air Policy and others, that actually you need a very small fraction of those allowances to compensate the major energy users. This is good news and bad news. It's bad news, because that contradicts, I think, basic conventional wisdom, so it's hard to develop a policy consensus around that. It's good news, because it means that there are, in fact, a lot of allocations available to compensate broadly the people who will bear the costs of this program, and to pursue broader social desires.

So, let me just close by recognizing that there are very strong disagreements remaining about whether, and how, to pursue a program. But I do believe that if this committee and the Congress decides that it is, in fact, appropriate to proceed, there is an analytical consensus forming that will enable that to happen.

Thank you.

The CHAIRMAN. Thank you very much, Jason. Jason, maybe, at the end of this session, I'm going to ask you to make a little presentation, so that those listening might understand what this upstream/downstream/sidestream hybrid—

Mr. GRUMET. I welcome the warning, Senator, thank you.

The CHAIRMAN. Can you get ready for that? If you need a chart, think about it. If not, get ready.

[Laughter.]

The CHAIRMAN. Samuel Wolfe.

STATEMENT OF SAMUEL WOLFE, CHIEF COUNSEL, NEW JERSEY BOARD OF PUBLIC UTILITIES

Mr. WOLFE. Good morning, Mr. Chairman, Senator Bingaman, and members of the committee. Thank you very much for the chance to participate here today.

The CHAIRMAN. You're welcome.

Mr. WOLFE. New Jersey and several other States have spent much of the last 3 years designing a regional program to cut greenhouse gas emissions from powerplants. We wanted a program that would get real reductions in greenhouse gas emissions, that would minimize the cost to energy consumers, and that would make our region's economy more competitive rather than less competitive with respect to the rest of the country.

The key to accomplishing all three of these goals—all three of these goals was the decision to hold back at least 25 percent of the emission allowances for the benefit of consumers, and specifically to leverage the value of those allowances to spur investment in energy efficiency, and also to encourage the development of renewable energy resources.

So, the result of this is that growth in our economy does not have to be accompanied by growth in greenhouse gas emissions. And what means for the cost of the program is, we're keeping down the demand for these allowances, keeping down the price of these allowances, as a result, and so, in that way, trying to keep down the overall direct cost of the program.

In addition to that, investing in energy efficiency in renewable energy means that we're less dependent on fossil fuel electricity, and we're making better use of the energy that we have. So, the result is that we are keeping down the pressure on electricity prices, as well, and, indirectly, since so much of the electricity in our region is generated from natural gas, keeping down the pressure on natural gas prices, at the same time. So, as a result, I think we've positioned ourselves to be more competitive than regions that generate and use electricity less wisely.

Now, we don't accomplish any of this, and we certainly don't have any effect on wholesale prices, if we were to simply hand all the allowances over to the electric generating community. And the Congress is true, too. By holding back 25 percent or more, we're not having any effect on wholesale prices as a result of that, either.

So, just to sum up, I would respectfully suggest that a wise national program would share the same goals as a regional program, achieving real reductions in greenhouse gas emissions, minimizing the cost to energy consumers, and making ourselves more competitive with respect to the rest of the world, rather than less competitive.

And I'd also suggest that leveraging a greenhouse gas program is not simply a matter of damage control, it's really an important reason to do the greenhouse gas program in the first place. We're going to be making an awful lot of investment in our energy infrastructure over the coming years. And whether that's a matter of investing more in railways to transport coal, powerplants to burn it, transmission lines to deliver electricity to places where it can't get right now, you know, if we put that investment in those directions, we're doing nothing more than perpetuating what we're doing right now, and we're—and we have the chance, with a wise national program, to, instead, put our country on a course towards really equipping ourselves to be as competitive as possible in the 21st century.

Thank you.

The CHAIRMAN. Thank you very much.
William Pizer.

STATEMENT OF WILLIAM PIZER, SENIOR FELLOW, RESOURCES FOR THE FUTURE

Mr. PIZER. Thank you, Mr. Chairman and members of the committee, for the opportunity to speak here today.

I should say that my comments don't reflect any sort of institutional position of Resources for the Future, which is an inde-

pendent, nonpartisan, nonadvocacy organization that doesn't take positions on matters of public policy. So, these are my own comments.

What I'd like to do, really, is just make two points—first, about the difference between upstream and downstream points of regulation. And I guess I would like to point out that, in the European emissions trading scheme, which is the only example we have of a CO₂ program right now, which is a downstream program, they actually don't measure emissions directly; they measure fuel use, and they apply emission factors to that fuel use, which is exactly the same thing we do in an upstream program. So, it's not obvious to me that some of the differences that people suggested with regard to what it'll encourage or incentivize are really there.

The second point I'd like to make is that a lot of people have pointed out the capacity to differentiate between where things are regulated and where the allocations are going to occur. And I would suggest that, not only can we do that, but we probably should do that, and that's because the costs of the program do not generally follow where the regulation occurs. And, again, I would point to the experience in the EU ETS so far, where, in power markets, the German power markets, what we've observed is that even though the power companies are required to turn in allowances for the CO₂ emissions associated with the fuels they use, what we see is that power prices in those markets have actually risen sufficiently to cover most of the cost of those allowances, even though they're getting the allowances, 95 percent of the allowances, for free.

Now, this is not to say that in the U.S. power markets, we shouldn't be giving out allowances for free. It just means to say that when we choose where we're going to give out allowances, it shouldn't be blindly applied to where the regulation is—actually occurs. And I think we actually can say some pretty intelligent things about where the costs are borne and who might deserve to get allowances in order to be more equitable.

Thank you.

The CHAIRMAN. Thank you.

Well, that finishes the panel. And, Senator Bingaman, that brings us to questions. And if you'd like to go first?

Senator BINGAMAN. Thank you. Let me ask—sort of, follow up on Billy Pizer's comment there.

As I understand it, EIA's estimate is that the cost of a mandatory program, such as the one that NCEP, this National Commission on Energy Policy, has proposed—the cost would be roughly \$4 billion a year. I think Jason referred to that. At the same time, the program would allocate somewhere between \$30 and \$40 billion worth of allowances. I guess I'd like your explanation as to how those two numbers relate. I mean, does it make sense to be allocating \$30 to \$40 billion of allowances? And what will that—what will the ultimate economic effect of doing that be, relative to the \$4 billion cost of implementing the program, overall?

Mr. PIZER. Sure. The \$4 billion—or the \$3 to \$4 billion that Jason mentioned reflects the cost to the economy of undertaking specific activities to reduce emissions, like switching fuels or applying more energy-efficient technologies, or what have you. And so, that's the real cost, in terms of resources.

The \$30 to \$40 billion represents the value of the allowances. And this isn't a real cost, in an economy sense; it's a transfer from whoever doesn't have the allowances, and needs them, to whoever is allocated the allowances for free, or to the Government, if they're auctioned. It's much the same way as if housing prices go up. It's not a really cost, in the sense that someone owns the house, and they get the higher price. It's just a transfer between who has the allowances and who needs the allowances.

Senator BINGAMAN. Mr. Chairman, you might—did you want to have Jason go through this description?

The CHAIRMAN. I did, but I want to make one other observation.

I noted that sitting over here were two people. Ned, you mentioned that you did work for the European community, and our first witness talked about the failure of the program. And I wondered how compatible you were, sitting there together.

[Laughter.]

The CHAIRMAN. Well, first, I assume that you told them how to do it, and they didn't follow your instructions. Is that—

[Laughter.]

Mr. HELME. Not at all, sir. I think they've done very well. I don't think the program's a failure at all. My sense is that it's quite successful. It's underway. Prices are a little higher. What Billy Pizer was pointing to, in terms of the German situation, just as someone on your earlier panel raised, in Europe the electricity markets are not fully deregulated. And so, companies are actually able to capture monopoly pricing in some situations. And there's a lot of debate now that companies are basically passing on costs, saying it's because of the allowances, and basically capturing some big rents. And I think that'll be fixed, over time, as a major debate in Europe. But, remember, this is the first year. They've got a 3-year pilot phase. The real program kicks in in 2008. But, I would argue, it's been quite successful, so far.

The CHAIRMAN. Yes, ma'am?

Dr. THORNING. I'd like to give a little different perspective on that. As I'm sure most of you know, the European emissions system only covers one-third of all power generation. For the Europeans to actually put in place a system that covers all emissions would be political suicide, because energy prices and trading prices would have to rise such that it would simply be unsustainable. So, I believe that the European emission trading system will not ultimately prevail, and that they will gradually be moving toward a more realistic approach, reducing global greenhouse gas emissions. In my discussions with officials and companies in the EU, I sense a growing unease about where they're going with this. And Italy has already said it wants to opt out of the second commitment period.

So, I think we need to look carefully at the lessons we can learn from Europe, and not make the same mistakes they're making.

Mr. HELME. Can I respond?

The CHAIRMAN. Absolutely.

Mr. HELME. In terms of the, (a) all of electricity generation is covered, not one-third. About 45 percent of total emissions are covered, in terms of the overall sectors. You threw me off by your comment.

In terms of the politics of this, the way the European Commission works, once you have a regulation in place, as they do, it requires an action by the Commission to pull it back. The member states can't stop it. In fact, there's a lot of debate about extending the program to aviation, to transportation, et cetera. And, I would argue, that would be smart, but their programs of taxes and the efficiency standards that they have in other sectors are less cost effective than a trading program, that, over time, you will see this program expand to other sectors, because—precisely what you heard in the first panel, broader trading brings costs down, you get more environmental bang for your buck, and that's what you want. So, I think—I have quite the different view from my colleague here.

The CHAIRMAN. All right. Well, I guess time will tell.

Now we're going to have Jason give us a little explanation of how this works.

Jason, are you ready?

Mr. GRUMET. Sure. This nice chart, to my left—and, I guess, up on the screen—provides a useful visual aid. Thank you for that.

A few words about point of regulation, which, I think, in general, is really the question of, where in the energy food chain do you place the burden to collect and surrender permits to the Government? Boiled down, it's an administrative issue. It really, as has been said, has no bearing on the costs of the program, and, ultimately, no bearing on the ultimate effect of the program. It does bear significantly, though, on your options with regard to the scope of your overall program. But, from a substantive sense—and, I would say, from political sense—it bears strongly on the question of who gets the goodies at the outset of the program. And I'll say a word about that.

What this chart shows is essentially the range of options, from the top of the food chain, fuel extraction, which would be oil wells, point of entry of petroleum. It's the economy coal mines and—with natural gas, there are a number of options, but the top of the food chain would be natural gas wells. Going all the way down to the right, you see the true downstream expression, which would be, you know, light sockets, small businesses, automobile tailpipes. I think that when most people talk about a market-based program, they're imagining something generally on the upstream side of the equation. To go all the way downstream, I think that the statements from Shell, that we should really focus on the auto companies, would be perceived by the auto companies as advocacies for CAFE, which is really more of a command-and-control option, as would be setting new efficiency standards or, in some ways, requiring limitations on, you know, use of energy.

So, I think the real debate kind of fits into the top half of the equation, what Jeff Sterba and others described as a hybrid program, where you would regulate the large stationary smokestacks, which is the full scope of the program in the EU, at that point of combustion, and everything else above that. To my mind, it's really essentially still an upstream expression.

And I guess there's two, kind of, closing points that—I don't pretend to have the monopoly on this topic—as both Mr. Helme and Ms. Thorning point out, the European Union only focuses on the large, stationary-source emitters. It does not, in fact, have full pro-

gram coverage. It covers about half of the economy. To move beyond that half of the economy, my view is, you have to actually move the program farther upstream, that to go smokestack by smokestack, you start getting very, very small smokestacks after about half of the emissions are covered. You have to start regulating bakeries and, you know, small businesses. Not going to happen. So, if you really want full program coverage, that actually, in some ways, pushes you farther up the food chain.

The second point, which I think is less substantive, but politically, in some ways, more important, is that there is a perception, based on history, that who you regulate is the entity that should get the lump sum of the allocation, at the outset. That has been our history with the acid rain program and other stationary-source control programs. Billions—Rich Richels and others can explain to you better than I why carbon is different, but I think there is a perception that if you are regulated, you're going to get more of the allocation at the outset. And I would suggest to you that some of the preferences we're hearing about point of regulation are actually derivative from the broader question of who gets the allocation to start the program. And so, I think there is a clear political linkage between the two, while there is no necessary substantive linkage between those two questions.

I would pause there.

The CHAIRMAN. Okay. Does anybody want to comment on—as a panelist here, on that chart, on that explanation?

[No response.]

The CHAIRMAN. Okay.

Senator MURKOWSKI. Mr. Chairman?

The CHAIRMAN. Yes.

Senator MURKOWSKI. Can I just ask for you to follow up, then, on your last comment there? You're suggesting that the downstream users, the household—the little folks, even though they're not subject to the regulation, you're suggesting that they share in some of the allowances. And you've indicated that perhaps Mr. Richels or Mr. Pizer can speak more to that. Can—

Mr. GRUMET. I'll frame it, and then pass it on.

The Energy Commission believes strongly that the allocations—the free allocations should be given to the people who bear the burdens of the program. And, you know, different people have their different estimates, but you've heard the word—the number, 10 percent, thrown around, that the actual regulated entities are only likely to bear, cumulatively, about 10 percent of the costs of the program. And that is because they pass those costs on. If the cost of coal increases because they have to purchase in permits, that will then get passed on to the electric sector. And so, even if the electric sector wasn't regulated, they will still bear costs from this program. And then, they, being good, smart capitalists, will pass those costs on, through higher electricity prices, and large energy users, like the aluminum companies, and others will bear some cost of compliance. And so, actually, the point of a carbon constraint is to send a price signal all the way through the economy so that everybody has an incentive use energy more wisely. And so, in that regard, there is a logic to trying to allocate broadly. There are a lot of different ways in which people suggest that be done, but the

notion of an auction as a mechanism do so that is simply that you would raise revenue that then could be disbursed broadly through society. But there are other suggestions that people actually give direct allocations to a cement—to the cement industry to cover some of their costs of higher energy costs, and then they would sell those allowances to the energy producers, or whoever needs them, to create some greater equity.

The CHAIRMAN. Okay. Good question—comment.

Yes, Richard?

Dr. RICHEL. With regard to the—thank you. With regard to the issue that you could somehow make the electric utility industry whole by allocating between 5 and 10 percent of the permits to them—and, earlier, Ned mentioned the study by CRA—there was a subsequent study by CRA, I believe, that took a very careful look at the analysis that came up with the 5 to 10 percent number, and found some very unrealistic assumptions underlying that analysis. I won't get into the detail, but one of the analyses were that the utilities would receive the permits in perpetuity. When they calculated the number of permits that would be required to make the utility whole under what they consider to be more realistic assumptions, the number was more like 75 percent.

Now, I'm not saying that 75 percent's right. I'm not saying that 10 percent is right. What I think that the Senators need to understand is that there's a great deal of uncertainty underlying some of the numbers that are being tossed around.

The CHAIRMAN. Ned, before you—I know you had your hand up, but I had on my mind asking you a question. You threw around—mentioned a number, 8400.

Mr. HELME. Yes, sir.

The CHAIRMAN. About that number.

Mr. HELME. This is the number of entities—you know, plants, sources—that would need to be regulated if you did the hybrid, the combination that Jason and I have been talking about, where you regulate the industrial point sources over a certain size, and you go to natural gas distribution companies and oil refiners and natural gas processing plants. There's about—this is several years ago—there were 8400 facilities. And the EU program today is, like, 12,000 facilities. So, clearly that hybrid kind of thing, which would cover basically 100 percent of the economy, could be done with 8400 facilities, which is quite workable, in terms of a regulatory program. Whereas, if you went downstream as—you know, down to the individual bakery and dry-cleaner, you're talking about hundreds and hundreds of thousands of sources. So, in contrast, an upstream system that's just coal mines, coal preparation plants, natural gas pipelines, distribution, refineries, is about 2,000 sources. So, either way, it's quite workable.

But, I wonder, as to Rich's comment about the studies—I think the other key point here for Senators to think about is the amount of allowance you need to give to, let's say, the utility industry is completely a function of how tough the cap is. Okay? In the study I cited, we were looking at a cap at 7 percent below 1990 levels, basically the equivalent of the Kyoto target for the United States. The kind of study that Jason's talking about, for the proposal NCEP put together, is a much less stringent cap. And so, less al-

allowances are required. In our study that the CRA did, we found the utility industry needed 26 percent of the allowances, and in Jason's study it's, like, 10 percent, but that's because it's a less stringent cap. So, remember that when you think about this, obviously the tougher the cap, the higher the cost, the more you need to give to the companies to offset their—the loss to their shareholders. So, that's the way to think about this.

The CHAIRMAN. Senator Murkowski.

Senator MURKOWSKI. I want to follow up on the 8400 comment. That's today. That's the number today. How do we deal with the fact that we've got a growing population? How do we account for—if you've got a cap-and-trade program—this is what some of those who object to it say—you can't account for an increasing population. How do we keep those sectors—for instance, the coal industry, which many of us are concerned about—how do we keep those from seeing rising unemployment rates? We've got a society, an economy, that's constantly moving, constantly in flux. How do we account for those?

Mr. HELME. Well, there's two answers, I think. One is, in terms of the number of facilities, it's a function of how many cement plants, steel mills, refineries, powerplants, et cetera, are built. So, I would argue that—not going to be that many more. I mean, it might be more than 8400, it might be 10,000, over time, but not such a problem. But your other question is trickier. It's, sort of—when I say it's enough to give 26 percent to the utility industry to hold their shareholders harmless, that's not the same as saying—for the coal industry, it's 34 percent—that's not the same as saying, "I'm taking care of the communities," or "I'm taking care of the workers," or, "I'm taking care of the railroads." That's saying, "I'm taking care of the shareholders of coal companies, electric utilities companies, steel companies, et cetera." That's not the same thing.

And the point I think Jason was making, that we have a lot of allowances left over when we take care of those shareholders. A portion of that certainly could be put to the workers. I mean, if we're going to have an effect on oil refinery workers, they could be compensated.

So, the point here is, you've got plenty to play with. There's a lot more money on the table in a carbon program than there was in the SO₂ trading program. So, there are ways to design this. And I think we can say, ideally, from an economist's perspective, you want to auction as much as you can. But from a political perspective, it's all about equity, who—as Rich Richels said, who do we want to give this to? And there's plenty of opportunity to do that.

The CHAIRMAN. Mr. Pizer.

Mr. PIZER. I just wanted to add to Ned's comments and say, you don't want to get the impression that you can make everybody okay. I mean, this is a program that's going to cost \$4 billion to someone. But the point is, is that you can use the allocation, if you do it carefully, to try to control the distribution of those impacts and make sure that the communities or the companies that would otherwise be more adversely affected, are somehow compensated. And I think that, you know, we have some idea, and you've heard some different estimates today. I was actually going to point out that I think the estimate that Jason referred to, that said 5 to 10

percent, was actually 5 to 10 percent of the total. Whereas, I think the number that Ned was talking about was actually 20-something percent of the power sector's actual emissions. So, when you take those together, they're actually not that far apart.

The CHAIRMAN. Okay.

Mr. PIZER. Well, the point was, is that this is 10 percent of a pool for the entire economy. So, if you talk about that, relative to the emissions in the power sector, it's actually closer to 20-something percent. I think that the estimates that we've heard, while they're going to be subject to debate, clearly, there are numbers that can be dealt with in the power sector to deal with them.

The CHAIRMAN. All right.

Senator Bingaman.

Senator BINGAMAN. I wanted to ask Samuel Wolfe to comment a little more on this public benefit allocation that you folks are contemplating in this RGGI program. How does that relate to what Senator Murkowski was asking about there? I mean, how do you see this working? And would each State make its own decision as to what allocation to make to what purposes? How would it work?

Mr. WOLFE. Thank you, Senator.

It would be a State-by-State decision about, first of all, whether to stay at the 25-percent floor or whether to go above that level. It would also be, I think, a State-by-State decision on exactly how to invest the proceeds of that portion of allowances, but with set-aside to benefit consumers. I think the best way to do it is to see where you can best leverage that money, if, say, by investing—and some of what we've seen in the modeling that's been done for the Regional Greenhouse Gas Initiative is that by investing that money in energy efficiency, we see a very quick and very large reduction in the cost of CO₂ allowances, and that means, again, a very quick and large reduction in the cost of the program. So, that seems to be a much better leveraged way to take advantage of the resources that we're creating when we create a cap-and-trade system.

Just to expand on that concept, one thing that I think we're all circling around here is the idea of making regulated entities whole. And it's worthwhile just taking a moment to explore what that means.

One way to help reimburse them for their costs is certainly to hand them allowances. But in a large chunk of our electric generating fleet in this country they're not subject to utility regulation; and so, they are going to recover their costs of a greenhouse gas cap through the wholesale electricity markets. And they are not going to change their behavior in doing that; they're not going to seek to recover any less money through the wholesale markets, if they're handed a larger stack of allowances. Really, it's two separate things. And the allowances that they're being handed are basically almost a direct pass-through to the shareholders, in addition to the money that's going to be recovered through the wholesale power markets.

The CHAIRMAN. Senator Feinstein.

Senator FEINSTEIN. Thank you very much, Mr. Chairman.

I wanted to go back, just for a moment, to what California is doing, because it's certainly the most aggressive action in the Nation, so far. And they have a macroeconomic study from the Uni-

versity of California at Berkeley that actually shows that these limits will produce new jobs and new employments, and, actually, as a boon to the economy of the State.

I see you nodding, Mr. Helme. I'd like everybody to comment on that, because the fear has been economic disadvantage by moving in this direction. Everything I see is economic advantage in moving in this direction, because, sooner or later, global warming is going to begin to impact every company, as well as every other kind of entity on the planet, if we don't address it.

Mr. HELME. We work extensively with them, and did our own sort of bottom-up microeconomic study that mirrored the kind of findings they had. So, I think it's—you're right, in terms of the level of reductions that are required in the caps in California, it is a very positive picture. A lot of that positive picture comes from the Pavley auto standards, where you're saving a lot on gasoline consumption, that far exceeds the cost to the automakers that goes in building in additional price of the hybrid cars, and that sort of thing. So, a big piece of those benefits from that, and also for energy efficiency. But I agree with you.

Senator FEINSTEIN. Right. Anybody else on that? Please.

The CHAIRMAN. Please. Margo?

Dr. THORNING. I'd like to mention that there is some work on the ACCF's Web site looking at the impact on California of trying to meet emission reductions. And we found, with our general equilibrium model, by—I think Charles River Associates also prepared that study—significant cost to California, in terms of jobs and employment. So, I think you need to look very carefully at the two different microeconomic simulations and assess the question of how realistic the assumptions are.

And, second, just to draw us back one more time to our friends in Europe, Europe is, of course, growing at 1 percent or less a year, and the higher energy prices they're facing are definitely having an impact on their ability to provide jobs and sustain well-being. So, I think it would behoove us to take a good look at the voluntary approach, which the EIA's own recent analysis shows is more productive, in terms of reducing greenhouse gas emissions and reducing electricity prices, than is a mandatory emission intensity reduction program.

Senator FEINSTEIN. Mr. Marron, and then Mr. Richels.

The CHAIRMAN. Just before we go to the next person, could I ask Ned—you mentioned two main reasons that the economic study came out positive. Repeat them again.

Mr. HELME. The two biggest pieces of benefits are the benefits from the California car standards, where you get a lot less consumption of gasoline, because it's much stricter standards, and so that's a big saving for consumers, and more than offsets the additional costs to the automakers of producing the more efficient vehicles. And, second, the extensive energy efficiency program and removals program that they're building, which has huge—again, it's like appliance standards—the homeowner gets a more efficient dishwasher, and obviously saves energy for a long period of time, so big benefits there.

The CHAIRMAN. All right, thank you.

Now, who was next on this?

Donald.

Mr. MARRON. Yes, I want to just say that from the macro-economy point of view, introducing the kinds of regulations that have been discussed today would almost certainly have net costs, leaving aside whatever benefits come from preventing, possibly, or changing, the degree of global warming. And I guess the easiest way to think about that is to think about the various products that we produce today in the economy—say, electricity—if a cap-and-trade system were implemented, firms would either be paying more for the fuel sources they get, switching to more expensive fuel sources, or installing various kinds of capital that might capture and sequester emissions. All of those things are a net cost. They may employ people, but, from a macroeconomic point of view, what you basically observe is a switching of jobs from one role, where people used to produce some other products, into a role in which they're helping, in essence, execute other requirements of the regulation. And so, again, I think, from an overall economy point of view, the key issue would be whether the costs that are imposed by the regulation are balanced by more than offsetting benefits from the environmental benefits. They're not going to be offset by benefits within the economy.

Senator FEINSTEIN. Mr. Richels.

The CHAIRMAN. Richard, did you want to comment?

Dr. RICHEL. Actually, I couldn't have said it better than Donald. I mean, what you're talking about is what economists typically refer to as a "free lunch." I don't think we should fool ourselves into thinking that there's a free lunch out there to be had. It could be the best lunch we ever paid for, but I think we're doing consumers a disservice by telling them that we can get all this done at zero cost.

I think that the California study, we need to start taking a more careful look at that. I've summarized the IPCC economic analyses, the Intergovernmental Program on Climate Change analyses, for the last three reports. There's been a lot of tension between the top-down modelers—I'm pleased to say Billy is an example of a top-down modeler, as well as myself—and the bottom-up modelers. Bottom-up modelers tend to think that there's a lot of—awful lot of inefficiencies in the economy, so much inefficiencies that if we could just take advantage of those inefficiencies, we can put the economy on track, and it'll be a win-win for the environment and the for the economy. I just am not convinced that that's the case.

Senator Feinstein, EPRI will be doing an analysis of the California situation, looking at the costs of California going it alone. And, typically, we find that when a State goes alone, there is a cost to that State. There's a migration of jobs out of the State, there's a migration of employment, there's a decrease in net income.

And, you know, the best of all situations—we say we want as wide a coverage as possible—well, we want it to be globally, is what we would really like to see. I mean, that's the way to really protect the environment. The United States could reduce its emissions to zero, and it's not going to stabilize atmospheric concentrations. Without international cooperation, then we'll have to go to some kind of country-by-country action and hope that, at the end

of the day, we'll be able to put together some kind of patchwork quilt.

But I'd hate to see us put ourselves in the position where we have to put that patchwork quilt together at the State level, because that's going to be extremely difficult to do. And I commend you on coming forward and trying to move California, where I just moved out of after 28 years, into a more national perspective.

Senator FEINSTEIN. Okay.

The CHAIRMAN. Thank you.

Now, we're just getting near the end of this. Let's go, Jason.

Mr. GRUMET. If I can pile on. First I'd like to say, Richard, I hope you didn't move because of the job dislocation.

[Laughter.]

Dr. RICHEL. Well, I would have done that later.

Mr. GRUMET. I am neither a top-down or bottom-up modeler. But I think it's important to recognize the frame of this issue, and that is that for a long time there have been some who have been saying this is free and easy, and there have been some who have been saying it's economically ruinous. And neither, I think, is the case.

There are clearly significant opportunities to have benefits, in addition to the environmental benefits, from encouraging efficiency and trying to internalize these costs of carbon. And I think many of those will be long-term benefits, they'll enhance our economic competitiveness overseas, they'll provide all types of benefits. At the same time, there will be real costs of this program.

And, I think, to Senator Murkowski's broad, and, I think, most important question, how do we make sure that those costs are, in fact, consistent with our broader desires for economic well-being? And that's a question of program design at a metalevel, which is really not invoked in the white paper. That's a question of the pace of emission reductions, whether or not you have cost certainty to overcome the kinds of unhappiness that they've been experiencing in Europe, where the costs are about three times what had been initially perceived, and whether, in fact, you also invest resources in new technologies to provide an incentive.

And I guess I would just say, at the end of the day, the first panel nailed it, that this is about technology. And the question is, how do you create the incentives for technology? There's a polar argument which says, do it all through markets, do a kind of Kyoto-like—you know, put it all on business. We don't think that's going to work. There's an all—a voluntary notion, which says, put it all on the tax base, have it all done through taxpayer-funded incentives. Don't think that's going to work.

What the Commission believes is, you need a combination. You need a modest market signal, to provide a long-term message to the ingenuity of America to start to make different decisions and to have the benefit of generating some revenue to provide incentives. So, you have kind of a pull and push, which gradually moves us forward. And, I think, with that kind of combined approach, we can take a meaningful first step.

The CHAIRMAN. All right. Getting close now.

Richard.

Dr. RICHEL. I just want to add to that. I totally agree that cap-and-trade, or whatever market mechanism we need, makes a lot of

sense, as far as economic efficiency is concerned. But without a technology policy that goes along with it, it's going to be very difficult to do the heavy lifting that's going to be required downstream. And that's not going to come about through cap-and-trade. We need, somehow, to incent the public sector and the private sector to make sure that the carbon-free technologies are available in the future, when we're making those 50-percent reductions or 80-percent reductions that will be required to stabilize atmospheric concentrations.

The CHAIRMAN. Okay.

Ned.

Mr. HELME. I just want to clarify that I agree with Jason's point, on the larger, longer term. Clearly, it's not going to be a free lunch, by any means. You're going to face additional cost. And I agree with Richard's point, here at the end here, the reason we really need to push technology—and that's why I propose this reverse auction, where you put some of the allowances out there—is that if you look at the SO₂ program in 1990—you remember, the acid rain program—the cost estimates for SO₂ scrubbers and for NO_x SCR controls were much—factor of two, factor of three higher than they are today. We've got a cap. We drove the technology. The competition of that trading market created a lot of innovation in the technology. And today we have very reasonably cost technologies. And that's why none of the utilities are objecting to the CAIR rule or—and so on, because they know what it costs, and it's not absurd, in terms of the costs.

And our hope with climate is the same way. We need to drive the technology. We don't have the technologies today. You know, we're talking about gasification sequestration, but it's 30 percent more expensive than—you know, traditional supercritical coal. That can happen. If we drive those technologies—same with nuclear, same with advanced renewables—if we drive those technologies now, by the way you design the program, by creating a set of allowances that make it attractive for people to build those technologies and not—today they can't make—recover their costs doing that, for the most part. So, I think that's where we want to go. And we'll see the same pattern, I would argue. Those technologies will be competitive by 2020, and we'll be able to get there.

So, I agree with a lot of our panelists here, that that's where we need to go.

The CHAIRMAN. Okay. Margo? And we're going to wrap this up.

Dr. THORNING. I certainly concur we need to drive technology, but I—focus this on the strong role economic growth can have in pulling through the technology that we need. For example, in Europe, emissions intensity has only fallen by 7.6 percent from 1997 to 2003, in spite of their mandatory push. Here in the United States, emissions intensity has fallen by 12.6 percent over that same time period, because we're growing in, on average, 3½ percent a year. Europe is only growing at 1 percent. So, economic growth can play a really strong role in pulling through the technologies that we need. And another incentive that, as I had mentioned before, we need to focus on is making our tax code competitive with the rest of the world.

The CHAIRMAN. All right.

Senator Bingaman.

Senator BINGAMAN. Let me just ask Ms. Thorning. It's true, though, that most of our growth is in the service sector as I understand it. Also, we are much less efficient than Europe, as a general matter, in use of energy. Therefore, we can reduce our energy intensity more easily. Am I right about either of those?

Dr. THORNING. Well, I would suggest that, because the United States has a whole different structure and is—you know, the distances are greater, energy prices have been cheaper—that it's not necessarily easier for us to make the kind of switches toward lower greenhouse gas emissions. But because we're able to invest in new capital, because our economic growth is stronger, we've made better progress than has Europe. And Europe is increasingly a service-sector economy, as well. And, by the way, in the service sector, there's a lot of manufacturing buried in there, because there's been a change in the structure of how services are provided to the manufacturing sector.

The CHAIRMAN. All right. We stand in recess until 2:30. Take your belongings with you and return to this room at 2:30.

[Recess from 12:11 to 2:36.]

AFTERNOON SESSION

Senator BINGAMAN [presiding]. Okay, why don't we go ahead and get started here.

Senator Domenici has been delayed with a meeting of the Appropriations Committee on the supplemental appropriation bill, but he's going to be here as quick as he can. But he indicated that we should go ahead and start.

So, why don't we just do what we did this morning, go around and have everyone make the points that they would like to make, and then we'll have some questions. Hopefully by then we'll have some additional Senators so we can have some give-and-take discussion.

Kateri, thank you for being here, with the Alliance to Save Energy. Go right ahead.

STATEMENT OF KATERI CALLAHAN, PRESIDENT, ALLIANCE TO SAVE ENERGY

Ms. CALLAHAN. Thank you, Senator.

My name is Kateri Callahan, and I serve as the president of the Alliance to Save Energy, which is a nongovernment and bipartisan organization dedicated to advancing energy efficiency worldwide. And, as the first panelist, I'd like to thank and commend you, Senator Bingaman and Senator Domenici, for organizing this conference and for inviting the Alliance to be part of what I consider to be a very important national dialogue.

The Alliance has two overriding recommendations today. First, we would like to urge that any national climate strategy employ energy efficiency to the greatest extent possible, because there's an impressive body of study that suggests that such technologies and practices are the most cost-effective means we have at our fingertips to controlling greenhouse gas emissions. And, second, while we engage in what could be a very protracted debate on national climate policy, we would like to urge the Congress to go ahead and

immediately adopt policies that will drive energy efficiency in every end-use sector. We believe that such measures are likely to complement any kind of an overarching national scheme that's finally enacted. And, meanwhile, we can begin to reduce greenhouse gases immediately, while also growing our economy.

We already have solid evidence that efficiency can, and is, delivering tremendous carbon savings to our economy. Our own research, Senator, indicates that energy efficiency policies, the building and appliance standards, the incentives we've put in place, and technology improvements, since the mid-1970's are allowing us to avoid the use of approximately 40 quadrillion Btus, or roughly 40 percent of the energy currently consumed, and that we avoiding the emission of almost 2 billion tons of CO₂ every year.

These impressive savings don't come close to tapping the full efficiency gains. For example, the modeling that was undertaken by RGGI, the Northeast greenhouse gas initiative, showed that doubling that region's energy efficiency policy impacts could cut electricity growth by two-thirds by 2024 and would keep carbon emissions flat, and it would do all of that while adding jobs, at a cost of less than 3 cents a kilowatt hour in improvement to the economy.

So, to reap the promise of energy efficiency in any national climate strategy, we ask that the Congress make explicit provisions for such technologies and measures. For example, if you undertake an upstream cap-and-trade program, we'd urge that you follow the lead of RGGI and allocate a significant portion, at least 25 percent, of the allowances or revenue from such an auction—or from the auction of such allowances directly to support energy end-use activities and other public benefits. And, again, as stated earlier, we believe it's critical to move forward today in front of any agreement on a national climate strategy to reduce greenhouse gas emissions, and we think you can cost effectively do this by implementing and funding the provisions—the energy efficiency provisions that were in EPAct 2005. We also urge you to consider adopting additional measures, including policies to improve the fuel economy of our light-duty fleet, to extend and expand the current suite of tax incentives—energy efficiency tax incentives that are in place, and, finally, to institute something I know you're interested in, Senator, a national energy efficiency resource standard and/or a public benefits fund that could be modeled on successful programs that States have underway to deliver—or to invest in energy efficiency.

We believe this dialogue is critical to the development of a sustainable energy future in the United States, and that energy efficiency represents the cheapest, the quickest, and the cleanest mechanism that likely will be considered all during this debate. We also believe, however, as I mentioned earlier, that we can take action now, a no-regrets policy, put in place Federal legislation that will drive energy efficiency, in transportation, in buildings, in the energy supply sector, and we can do that while we debate broader programs and make a meaningful impact on greenhouse gas emissions.

Thanks for your time, and I look forward to your questions.

Senator BINGAMAN. Thank you very much.

Michael Bradley, with the Clean Energy Group. Go right ahead.

**STATEMENT OF MICHAEL BRADLEY, EXECUTIVE DIRECTOR,
CLEAN ENERGY GROUP**

Mr. BRADLEY. Thank you, Senator.

My comments today represent the views of the six Clean Energy Group companies which support the Clean Air Policy Initiative.

Since 2000, these companies have actively supported a Federal multipollutant legislative approach for reducing NO_x, SO_x, mercury, and CO₂ emissions from powerplants. These companies include Calpine, Entergy, Exelon, Florida Power & Light, PG&E, and the Public Service Enterprise Group. Collectively, these companies own or operate more than 140 gigawatts of electric generating capacity in 40 States. This represents about one-sixth of the total U.S. generating capacity.

Our members support the adoption of a mandatory greenhouse gas regulatory program based on a fair and cost effective program design. We believe that the scientific evidence on the risk associated with climate change is sufficient to warrant immediate legislative action. We agree with many of the participants today that an economywide regulatory system could be effective in controlling greenhouse gas emissions. However, the practical reality is that the economywide approach will require tremendous political lift. I think we're seeing that.

We believe strongly that a sector-specific cap-and-trade program initially focused on electric generating would be a good first step in setting us on a course to begin reducing our Nation's greenhouse gas emissions. A cap-and-trade program for the electric generating sector could be designed to readily integrate into a broader economywide program at a later point in time.

As the industry makes substantial investments in both new and existing powerplants, we are better served by having the right economic signals in place to guide these capital planning decisions.

In terms of program design, my comments today will focus primarily on the methodology used for distributing allowances to the electric generating sector.

One of the options that we have seen proposed in the responses to the four questions over the last month is to use the allocation to compensate higher emitting facilities by basing the allocation on a facility's share of historical emissions. We disagree with this approach. We don't think that this approach is good public policy, nor do we think that it would be good business practice.

An allocation based on compensation fails to drive innovation and the deployment of new high efficiency generating technologies. An allocation based on compensation penalizes new market entrants that would be excluded from the allocation entirely. And, finally, an allocation based on compensation penalizes companies that have invested in generating fleets with a lower carbon intensity prior to the imposition of the cap.

Instead, we advocate an alternative approach that requires companies to earn allowances based on their current performance. Allowances are a valuable commodity that should be used by policymakers to drive investment decisions that will lead to better environmental and lower costs.

Specifically, we advocated updating output-based allocation. Under this approach, allowances would be apportioned based on

the facility's recent power output. This creates a very strong financial incentive for improving powerplant efficiency. Also, an updating—output-based allocation approach encourages the deployment of new innovative technologies by providing a mechanism for new powerplants and new projects to be integrated into the cap-and-trade program on an equal basis. From a business perspective, we feel this approach is the right approach, because it treats companies equitably based on their ability to deliver low-cost energy supplies.

In the absence of an equitable distribution allowance approach, such as an output-based allocation, we would support an alternative allowance allocation approach, such as an auction, to ensure a fair distribution of the burden under national greenhouse gas programs.

Thank you very much.

Senator BINGAMAN. Thank you very much.

I am reminded here, we need to try to get this done in a couple of minutes, if people can possibly do that. But appreciate the good comments that we're hearing.

Michael Morris is here to represent the Edison Electric Institute. Welcome, and go right ahead.

**STATEMENT OF MICHAEL MORRIS, CHAIRMAN OF THE BOARD
OF DIRECTORS, EDISON ELECTRIC INSTITUTE**

Mr. MORRIS. Thank you very much, Senator. Appreciate the opportunity to try to be the first to get done within a couple of minutes. I'll do all that I can in that regard.

Senator BINGAMAN. We wish you well.

Mr. MORRIS. I'm sure you were addressing the previous speakers, not me, right?

[Laughter.]

Mr. MORRIS. We really are here to represent the Edison Electric Institute. I think you're very familiar with it, 185 member companies and 65 international affiliates, as well. We would like to commend you and your colleagues for the opportunity to be here and comment on the white paper.

EEl strongly supports voluntary technology, carbon intensity-based approaches to the global climate issue. We believe that this can—and, in fact, already has—achieved significant results. Technology is the key to addressing the greenhouse gas issue as we go forward. Strategies should be adopted that develop and implement a zero- or lesser-emitting generation technologies, taking into account the economic turnover of capital stock. Robust voluntary measures that reduce carbon emissions and emission intensity surely will get us in that direction.

Emphasis on the reduction of carbon intensity is important, because we think that's essential to make certain that we don't dampen economic growth as we go forward. In addition, we would support a robust budget support for the implementation of the issues that came up in the Energy Policy Act of 2005. And I know you're a strong supporter of that, as well.

We note the critical international dimensions of the climate change issue and the importance of investment overseas in technology and best practices.

The reality of rapidly increasing emissions from major developing nations such as China and India demonstrate the importance of the international partnerships and other voluntary technology-based multinational agreements like the Asia-Pacific Pact. We feel very comfortable with that, and believe it's the right way to go. American electric power and EEI will continue to work in that direction.

As we look at the issues in front of us, we believe that it ought to be an economywide system that surely is based on the point of the actual pollution themselves. We would talk about downstream and upstream analysis, as we go forward. And clearly we are strong supporters of the allocation method, rather than the auction method, and will address that we get to the questions.

I'm seeing the signs behind you that say I'm out of time.

Thank you.

Senator BINGAMAN. Well, thank you very much.

Fred Krupp, we're glad to have you here, and you're speaking for the Environmental Defense Fund.

STATEMENT OF FRED KRUPP, PRESIDENT, ENVIRONMENTAL DEFENSE

Mr. KRUPP. That's right, Senator, Environmental Defense. And it's an honor to be with you here today. And I want to commend both you, Senator Bingaman, as well as Chairman Domenici, for your leadership on U.S. climate policy and the progress you've made in opening this dialogue and allowing us to delve more deeply into this most serious challenge.

The first principle of effective climate policy is establishing a clear emissions target related to the problem we're trying to solve. That problem is the increasing concentration of greenhouse gases in the Earth's atmosphere, which are causing an accelerated warming of the planet.

Just last month, the *Journal of Science* published an article that found that the rate at which Greenland, the ice sheet, is draining into the ocean has doubled over the last decade, suggesting that a tipping point leading to the complete loss of the Greenland ice sheet and a 20-foot sea-level rise may be closer than previously predicted.

Because of the increasing flood of similar evidence, we must now establish real limits, not emissions caps that would allow greenhouse gases to rise. They would ultimately make our task more difficult and more costly.

In response to your questions on the point of regulation and allocation, we believe those decisions flow from the basic design of the program. In order to achieve reduced greenhouse gases at the least possible cost, the basic design of the program must include both a real emissions limit and an opportunity for all sectors of the economy to contribute to the solution. This is because Environmental Defense believes the most powerful tool to manage the cost of climate policy is the ingenuity of the American people responding to the incentives in a market economy. A stable and predictable emissions limit creates the demand for emissions reduction and offset technologies. Market demand and innovative entrepreneurs will provide a better mix of technologies than any government employee could choose. Similarly, the fundamental elements of emissions

trading and banking in a competitive market serve to grind down costs far better than any government program could.

Finally, I believe farmers can play an important role in meeting the climate challenge. Farmers can raise the crops that would become renewable fuels in ways that produce less carbon than traditional fossil fuels. This can provide a win-win solution for energy security and climate policy.

In addition, we think agricultural offsets are one of the most powerful tools to reduce costs. EPA's analysis of the Clean Air Planning Act last fall predicted that—carbon dioxide allowances prices between \$1 and \$2 if the use of offsets is unlimited. At the same time, they would provide new revenue streams for farmers as the world markets for farmers become ever more challenging.

Thank you.

Senator BINGAMAN. Thank you very much.

Next, Paul Bailey, who is speaking on behalf of Generators for Clean Air.

Go right ahead.

STATEMENT OF PAUL BAILEY, DIRECTOR, GENERATORS FOR CLEAN AIR

Mr. BAILEY. Sir, if I fail to meet the 2-minute challenge, it won't be Jonathan's fault. He has warned me.

Senator BINGAMAN. All right.

Mr. BAILEY. So, we'll see how I do.

I thank you for this opportunity today, Senator Bingaman. I also wanted to express our appreciation to the committee staff and the National Commission on Energy Policy staff, because they've been helping us over the last few months in explaining issues to us and responding to questions. And we appreciate that.

Although the members of this group—there are nine utility companies that belong to the group—although the members have different views regarding mandatory climate change legislation, all wish to be responsive to your request for input on the white paper. I will briefly summarize their major points.

If Congress enacts mandatory climate change legislation, it should apply economywide and should encourage all greenhouse-gas emission reductions and offsets. Reducing utility compliance costs and electricity price increases should also be a major criterion for deciding on point of regulation and allocation of allowances. The electric sector should receive an allowance allocation based on its pro rata share of covered greenhouse gas emissions. Legislation should allocate sufficient allowances to fossil generation to minimize utility compliance costs and increases in electricity prices to consumers.

A 95 percent allowance allocation to fossil generation would minimize both compliance costs and electricity price increases. On the other hand, auctioning allowances would increase compliance costs dramatically, without any additional environmental benefit. GCA is generally opposed to any auction. Allocation of allowances within the electric power sector should be based on either historic greenhouse gas emissions or historic heat input adjusted for type of fossil fuel combusted.

We support a safety valve for allowances—a safety-valve price for allowances to protect the economy and provide cost predictability. For similar reasons, Congress should consider mechanisms to ensure that compliance costs are recovered and that unregulated fossil generation is not penalized.

Lastly, Congress should also consider ways to avoid a patchwork of State requirements, in favor of a uniform Federal program.

Thank you.

Senator BINGAMAN. Well, thank you very much.

Next is Craig Montesano, with the National Mining Association.

**STATEMENT OF CRAIG MONTESANO, DIRECTOR OF
GOVERNMENTAL AFFAIRS, NATIONAL MINING ASSOCIATION**

Mr. MONTESANO. Thank you, Senator. We'll try to meet your mandatory requirement today on the time.

Senator, in our post-Katrina world, the National Mining Association believes Congress should consider climate policy in the context of energy security, technology development, and U.S. economic competitiveness. From this perspective, America's abundant supply of coal should be viewed not as a problem to be overcome, but as a solution to our growing dependence on foreign energy sources, a solution that requires only the proper investment in technology to fully realize its potential.

In fact, clean-coal-based electric generation and coal-to-liquids technology can play a vital role in addressing both our economic and environmental challenges. But this will be far less likely if Congress imposes a mandatory cap on greenhouse gas emissions. Rationing the use of our most abundant and least costly fuel will result in higher costs for U.S. manufacturers and consumers, especially in the 26 States that rely on coal to generate more than half their electricity.

Moreover, mandatory control systems in countries where they are in place are proving to be unworkable, amassing a record of missed targets, bureaucratic uncertainties that retard economic growth while yielding negligible reductions in greenhouse gas emissions.

By contrast, America's pro-technology voluntary multilateral approach is achieving economic productivity, matched with impressive reductions in greenhouse gas intensity. The Asia-Pacific Partnership embodies this approach. It is a serious commitment by the world's largest energy consumers to find long-term sustainable solutions to both clean development and emissions reductions.

Finally, the 2005 Energy Policy Act will greatly enhance the positive trends of which I speak, and America's coal producers look forward to working with the committee in fully implementing the Act.

So, in conclusion, we hope the solutions proposed at this hearing will address the energy and emissions challenge posed by China and India, and acknowledge the importance of energy efficiency and clean coal technologies for reducing America's reliance on foreign energy sources.

Thank you for fostering this constructive discussion on climate today.

Senator BINGAMAN. Well, thank you very much.

Kirk Johnson is here, with the National Rural Electric Co-ops. Glad to hear from you.

STATEMENT OF KIRK JOHNSON, EXECUTIVE DIRECTOR OF ENVIRONMENTAL AFFAIRS, NATIONAL RURAL ELECTRIC COOPERATIVE

Mr. JOHNSON. Thank you, Senator Bingaman, Senator Salazar. It's a pleasure to be here before the committee.

My name is Kirk Johnson. I am executive director of environmental affairs for NRECA, and I'm here representing the 930 electric cooperatives around the country who provide power to the 39 million Americans, who are not just our consumers, but who are also our owners. And so, we come at this from a slightly different perspective, being consumer-owned utilities.

I'd like to address a couple of general policy matters before we get to the specifics of your questions.

First off, I think, very much, Congress got it right last year, in the Energy Policy Act, by including the technology-based programs for our clean coal development and other programs to address the climate change issue. It garnered well over 60 votes, and we think that is the way forward on the climate change issue.

We also think the administration is getting it right on the international front by focusing on the Asia-Pacific Partnership. We believe that will be a more productive international effort than Kyoto or whatever might be following after Kyoto. And so, we think that's also going in the right direction.

It's interesting to note that the Kyoto Protocol appears to—or it appears the European countries will not meet their targets under the protocol. And it reminds me of a very famous quote from Albert Einstein, when he said, "The definition of insanity is doing the same thing over and over again, and expecting a different result." I don't think we want to do that.

To get to the specific questions posed by the white paper that you want to be here to discuss today, we, NRECA, support a voluntary technology-based program. And we have not supported mandatory climate programs in the past, and nor do we now. But if the Congress does decide that additional measures are required, we would give a few ground rules for those.

First, we think any policy must be sound economic policy, sound energy policy, sound environmental policy, and sound national security policy. We believe any approach must be economywide. We think there probably should be a safety valve or other type of economic off-ramp. Any approach must include a global component. And we firmly believe that allowances should be allocated, rather than auctioned, which simply imposes a tax on the American economy unnecessarily.

So, again, thank you very much for the opportunity to be here. I look forward to a productive dialogue.

Senator BINGAMAN. Okay. Our final participant on this panel is David Doniger, with the Natural Resources Defense Council. Thank you for being here.

**STATEMENT OF DAVID DONIGER, POLICY DIRECTOR,
CLIMATE CENTER, NATURAL RESOURCES DEFENSE COUNCIL**

Mr. DONIGER. Thank you, Senators.

I would like to make two points. First, we're facing very real dangers that require urgent action. Most serious climate scientists warn that we need to cut emissions at least in half by the middle of this century to avoid truly dangerous climate impacts. These emissions cuts must begin in the next 10 years if we want to pull this off with a minimum of economic impact. Delay makes the job much harder.

As this graph shows, a slow start would mean a crash finish. The rate of reductions that would be necessary to achieve a given target if we start later becomes much steeper and much more economically disruptive.

Senator Bingaman, you deserve a great deal of credit for working towards mandatory legislation, but the bill under consideration would only slow emissions growth and postpone decisions on cutting emissions for another 10 years. With respect, we do not have that much time.

It is possible to be more ambitious and yet still centrist. A long-term declining cap, tracing out the line in the—the green line on that chart—would meet the environmental challenge and also give businesses clear market signals to guide their investments. We have offered an alternative to the safety valve—borrowing—which can be used to prevent unexpected spikes in compliance costs without breaking the cap.

My second point is that emissions allowances, which would be worth billions of dollars each year, should not be given away for free to current polluters, giving them huge windfalls at consumers' expense. Rather, allowances should be used to cut costs and promote investments in energy efficiency and cleaner technology. So, we would recommend that at least half the allowances should be used to help consumers invest in energy efficiency measures that hold down costs and another quarter of the allowances should be used to help industries invest in the big change technologies that we need to cut emissions in half. And that sum also should be used to help communities adapt to the changes that can't be avoided. And we look forward to discussing these ideas today and in the future.

Thank you.

Senator BINGAMAN. Well, thank you very much. Thanks for your very interesting statements.

I'm joined by the chairman here. Did you want to ask any questions, to start with, or should we just go ahead with questions? We've heard from each of the witnesses.

The CHAIRMAN [presiding]. Let's proceed. Thank you very much, Senator Bingaman.

And thanks to all of you for your understanding. I don't know what you could do. Maybe you're not understanding, but you couldn't—

[Laughter.]

The CHAIRMAN [continuing]. You couldn't do anything about it, because I can't, either. So, I'm back.

And, Senator, if you'll just tell me where we are, we'll proceed.

Senator BINGAMAN. Well, we've heard from each of these witnesses. And now I think we're ready to present questions and—

The CHAIRMAN. Okay, let's go. You start, and I'll follow.

Senator BINGAMAN. Okay.

The CHAIRMAN. Thank you very much.

Senator BINGAMAN. Let me ask about—one of the disagreements that we seem to have built in here is the question of, if you do an allocation of permits, on what basis do you do it? I pick up that there is a difference of opinion. Mr. Bailey, you said, as I understand it, why don't you repeat how you think the allocation should occur. I believe, Mr. Bradley, you said it should be on an updated output-based allocation. And I think that's different from what you're suggesting. Mr. Bailey, could you explain whether you disagree with Mr. Bradley—and, if so, why?

Mr. BAILEY. Well, Michael and I have a different perspective on this. He favors updated output allocation. And my group, which is about 20 percent of the coal-fired generation in the country, favors allocating emissions—allocating allowances based on either emissions—in other words, if you produced 1 percent greenhouse gas emissions in some baseline period, you'd get 1 percent of the allowances. Or you can distribute allowances based on heat input, which is sort of analogous to that, also.

Senator BINGAMAN. You're advocating that, whether or not these particular companies actually incur costs. Am I understanding that correctly?

Mr. BAILEY. Yes, sir. That's merely a way to allocate allowances beneath that cap among the companies. That's exactly right.

Senator BINGAMAN. It seems to me that a lot of the witnesses I've heard from have been in favor of allocating these permits in order to reduce the economic impact on different entities in the economy. And if you got the ability to pass on the additional cost that's imposed, I don't know why you would want to—why it would make good sense to give you the permits.

Mr. BAILEY. I think, Senator, there are two issues here. And I get them confused sometimes, myself. One of the issues is, the electricity sector gets a certain number of allowances. And that may be what you're talking about. We can address that, also. I'd like to address that. The other issue is, regardless of the number of allowances, how those allowances should be distributed among the companies. So, I was addressing that latter question, given some number of allowances. The question you raised about how many allowances, let's say, the electricity sector should get, we looked at this. We were the ones who suggested a 95 percent allowance allocation. And we looked at that from the primary standpoint of reducing compliance costs and impact on electricity consumers. That's the only way we looked at it. We did some very simple math. We provided that in comments.

If you look at EIA's analysis under a National Commission on Energy Policy-type program, just pick one year, say in the year 2015, the increased fossil fuel costs are about \$19 billion in that year. So, those are costs that somebody's going to have to pay for. You can do that either of two ways. You can handle those costs either of two ways. For example if you auctioned all allowances off—there were no allowances given away free—then electricity price's

compliance costs would increase by \$19 billion in that one year alone. So, over, let's say, a 10-year period or so, the increased compliance cost would be about \$200 billion. But I'm just focusing on the year 2015 right now.

If fossil generation got a 90-percent allowance allocation, which some people mentioned this morning, that cuts those compliance costs by a factor of 10, so you've gone from \$19 billion a year in 2015 to about \$2 billion a year in 2015. If you provide a 95-percent allowance allocation, you've cut that again by a factor of two, and you're talking about compliance costs of about a billion dollars.

So, we looked at it merely from the standpoint of reducing compliance costs and electricity price increases. That was the only reason that we proposed that number. The allowance allocation, whether you had 100 percent auction for \$19 billion or a 95 percent allocation for a billion dollars, none of those—all those have the same environmental effect. The emission reduction would be the same under those. So, we propose that merely as a way to hold down electricity price increases.

Senator BINGAMAN. Mr. Doniger.

Mr. DONIGER. I think that Mr. Bailey's analysis is based on the model of a regulated utility and an assumption that if the allowances are given for free, they will not have any economic value to those companies and they will not be passed—there will not be any increases in electricity prices. Well, we don't know that that's the case, in that there is a market value to these allowances, and those allowances can be sold, and companies can reap a very large wind-fall.

We've made a proposal, which would deal with the fact that some of the electric utilities are under regulation, and others are not. And that proposal would be to give the allowances, in either case, to the distribution entities, with a proviso that those allowances would be used to pass through savings to ratepayers and also to invest in energy efficiency for business and residential customers to hold down costs. In a regulated scenario, the company may be—it may be vertically integrated, so it may be the same as giving this to the generator. But in a deregulated scenario, there's a market transfer that will occur between the distribution company and the upstream generator. In either case, you would be getting the value of the allowances into the hands of consumers in the form of energy efficiency investments or in the form of lower rates, and we think that's a durable way to deal with the distinction between regulated and unregulated jurisdictions in the electricity sector.

Now, that's just the thumbnail sketch of an idea. It happens to be quite similar to what Betsy Moler suggested this morning. And we would be happy to explore it with the committee and with others to see if there's a way to bridge the gap between the—those who are talking about this from regulated versus an unregulated perspective.

The CHAIRMAN. Mike Morris.

Mr. MORRIS. Thank you, Senator.

First off, 80 percent of the fossil-based generation is still regulated in this country. And I would argue that some of those States that have deregulated are rethinking their approach to that as we

go forward. So, the point made by David, I'm not sure that that holds water on a wider range.

The fact of the matter is, credits that are given to utilities would defer a cost that, but for that, they would have to buy a credit or invest capital in some technology, and a customer's electric rates would go up. That's why we did the allocation based on the input method when we looked at the SO₂ and NO_x allocation process.

To touch on one of Michael Bradley's points, to say that that would then stop technology from being put in place, because we have all these credits, we wouldn't use them, is simply wrong-headed thinking. American Electric Power, Duke, Southern Company are all going forward with integrated gas combined-cycle technology facilities, all of which are extremely expensive and very much technologically driven. So, even with those credits in hand, we're going forward with that. So, part of the premise that is used by Michael, I think was a bit of a misstatement. I want to make sure that we get that on the record so that people realize how we use those. And to the extent that credits were in excess of the actual emissions targets that we have, and they were monetized, that goes back to your customer by way of a credit to the fuel cost. So, there is no gain. If, in fact, you went to an output—to someone who incurs no cost, then it would be a huge gain. And if those people were willing to credit whatever they got by selling those back to their customers as a credit to the fuel costs over the overall cost of delivery of electricity, that might be a fair way to look at that. But, short of that, it's just an economic grab.

Mr. BAILEY. Senator, could I add one thing?

The CHAIRMAN. Where was this? Paul?

Mr. BAILEY. Yes, sir, right here.

EIA did an analysis of the Energy Commission-type program some time ago, and we took a look at that. And we're not the first ones to work with a 90- or 95-percent allowance allocation. Actually, EIA's results, macroeconomic results, some of which were very modest for a program like this, compared with other mandatory climate change programs, those results were so modest, in part, because EIA assumed a 90-percent allowance—95-percent allowance allocation through the year 2013, and, after that, an allowance allocation of 90 percent. So, there is a case study in how an adequate allowance allocation can hold down these impacts we're all concerned about.

The CHAIRMAN. Now, we need the other Michael.

Mr. BRADLEY. Yes. Let's make it clear. Input is based, as Paul indicated, 1 percent of the emissions, they get 1 percent of the allocations. Output, it's—1 percent of the electric generation that's delivered gets 1 percent of the allocations. Similar to your car. Your car is regulated on a per-mile basis.

When it comes to some of Mike's comments, what we're talking about, from the Clean Energy Group's perspective, is allocating in a manner that sends a signal to create and continue to grow clean and efficient generation, zero-emitting generation, like renewables and nuclear, as well as low-carbon generating emission, like natural gas, combined-cycle natural gas. We're talking about creating a market signal for efficiency, for clean energy, which sends a very different signal for investments, going forward, than if you base

your allocation based on historical emissions. The more you pollute, the more allocation you get, is essentially what the basis comes down to.

We have advocated strongly in favor of Senator Carper's bill. And in his CO₂ title, there's an allocation scheme that treats all forms of generation equally, except for nuclear. Nuclear is just allocated based on the increased capacity that has been added to those facilities since 1990. An investment has been made. We would be worse off if it hadn't been made, in terms of CO₂ emissions today. And keep in mind that the emissions—CO₂ emissions from the electric sector have increased by approximately 27 percent since 1990. The portion of greenhouse gas emissions coming from the electric sector since—in 1990, it was about 36 percent, now it's about 39 percent. So, the sector itself is growing. It's meeting demand. It's delivering what it has to deliver. But it's not becoming less intensive, in terms of CO₂ emissions.

The CHAIRMAN. All right. If Paul would take that, one more, and then we'll move on to another one.

Mr. BAILEY. Okay. Just to put this in perspective a little bit, coal-fired generation, there are 26 States that get more than half their electricity from coal. Those are the States that these companies operate in, and those are the States we're concerned about being harmed economically by the wrong allocation scheme.

The CHAIRMAN. Yes.

Mr. BAILEY. I'm about to lose my point here. Sorry, I've lost my train of thought here.

The CHAIRMAN. That's fine.

Fred?

Mr. BAILEY. I apologize.

The CHAIRMAN. If you get it back, put your hand up.

Mr. KRUPP. Mr. Chairman, thank you.

As I listened to the back and forth about allocation, it reminds me that what's really primary here is, what's the level of environmental performance, and what's the level of design quality, so that we grind down the costs and have the least possible cost and the most innovation to the economy? I can understand that this allocation issue is going to be very important in the weeks and months ahead to your constituents. But I think we should bear in mind, it's really secondary to the primary issues of environmental performance, the cap, and design performance to grind down the costs. And if we keep sight of that, there probably is more than one answer to this allocation issue in—it's an equitable question, and an important one. I don't mean to minimize it, but I do think it's secondary.

Mr. BAILEY. I got my thought back, Mr. Chairman.

The CHAIRMAN. Just a minute.

Mr. BAILEY. Yes, sir.

The CHAIRMAN. Fred, secondary in the context you have just put it, but maybe not secondary from the standpoint of us having to work something out with constituents of our country. It may be very primary as to how we're able to allocate. That may be our toughest job.

We could arrive at those others, because in—matter of fact, they're not pinching anybody, right? They're theory. They're what

you'd like to do. They're goals. But when you get to the other, people are going to be able to—institutions, entities are going to be able to measure what we're talking about, right?

Mr. KRUPP. Yes. Mr. Chairman——

The CHAIRMAN. It's difficult.

Mr. KRUPP [continuing]. I understand what you're saying, and I completely agree with you. The primary thing that history will judge a bill on is the level of environmental performance, and, did it drive the cost down? But history will also judge the leadership that you, Mr. Chairman, provide, and your skill in bringing together parties, and Senator Bingaman's skill in bringing together parties, on what I've termed a secondary question, bringing together parties behind a cap-and-trade mechanism so that there is one, to begin with.

The CHAIRMAN. I understand.

Mr. KRUPP. We need your leadership on that, absolutely.

The CHAIRMAN. I understand.

Mr. KRUPP. And you're expert in that. I don't pretend to be.

The CHAIRMAN. I understand.

Fred, you had a quick rethought? Now, that—when you get a rethought, that means it's got to be short.

[Laughter.]

Mr. BAILEY. We took a look at the Carper bill that Michael Bradley likes, did some analysis of it, and we found that that penalized coal-fired generation about \$3 billion a year, based on an output allocation providing allowances for nuclear generation.

Thank you for your patience, sir.

The CHAIRMAN. All right. Okay.

Ms. CALLAHAN. May I make a comment on allocations, too? I mentioned in my testimony that we believe that there ought to be a significant share of the allocations set aside for energy efficiency and other public goods. RGGI has taken that approach and suggested to the States a 25-percent-or-more allocation. That is being proposed, because, to the point of cost effectiveness, there are measures that can be taken at the end use, particularly in the electricity sector, that could be more cost effective. And, in fact, the RGGI modeling has shown that there could actually be positive impacts to the economy and the creation of jobs by setting aside these energy efficiency allocations and upping their commitment, in terms of policy, to those activities.

The other thing I wanted to mentioned, that in order to get to that, RGGI had to change their modeling. And the modeling that we're doing now, in looking at the costs of implementation of cap-and-trade programs, often doesn't recognize the benefits of energy efficiency and appropriately model. So, the RGGI modeling that was done, and the work there, is really groundbreaking and can evidence what can happen, in terms of using energy efficiency as a cost-effective mechanism.

The CHAIRMAN. Before I give this mike back to Senator Bingaman, I was coming next to you on the subject you're talking about, because I'm having some difficulty understanding, although I'm intrigued, by your suggestion that significant reductions in greenhouse gas emissions can be realized by marked improvements in our ability to use energy more efficiently. I guess I'm just going to

ask you, would you just elaborate? Where are these savings going to be achieved? How do we reduce greenhouse gases, the emissions, and then—under a mandatory reduction program—and then have it designed in such a way that it encourages these efficiencies that you're talking about?

Ms. CALLAHAN. Well, sir, the way that it would operate—and it may not be a direct one-for-one—they're indirect emissions at the end use. And the way that you're creating—or—the emissions reduction is by avoiding the emissions, in the first place. You're not using the energy that you once were for the same end product or the same good. So, for example, in California, where they have employed energy efficiency building codes, appliance standards that are greater than they are in many parts of the country, they also have very significant public benefits funds, public education and outreach programs. Their electricity use is about 40 percent less than the national average in that State, per capita. So, I'm hoping I'm addressing your question on this, but it would be investments that would be set aside for energy efficiency improvements at the end use by homeowners, by commercial buildings, by energy users, electricity consumers, natural gas consumers.

The CHAIRMAN. Okay. Nothing exotic or extraordinary, just very straightforward. Some people wouldn't call them efficiencies. You do. I understand that. That's good. At least I understand what you're saying.

I have a question to the National Mining Association, and then I will go back to you, Senator.

Craig, the Energy Information Administration, in its latest long-range outlook, suggests that the United States will require half again as much electricity in 2030 as it now consumes. As much as 60 percent of that will be generated by the use of coal, which is kind of startling to a lot of people. The use of coal is not going to go down during the next 25-year projection of American use—going up—even though they're going to put some nuclear in, for the first time. We don't know how many. They at least show 'em, which is rather incredible, they do. How would a mandatory greenhouse gas reduction program alter the EIA estimate on the United States and how heavily we will remain dependent on domestic coal reserves for electric generation? Could you tell us why—that's one. And we'll talk about the developing countries, as a second question.

Mr. MONTESANO. Okay.

The CHAIRMAN. Could you answer that?

Mr. MONTESANO. Thank you, Senator.

I think the answer to the first question is, it puts us in a very bad fix in the United States, as far as energy. You mentioned the projections for coal-based electricity use. Now, coal-based electricity use since 1970, has increased 136 percent. By 2020, it's supposed to go up another 36 percent. I think that you can just bank on that number getting higher and higher.

The CHAIRMAN. Right.

Mr. MONTESANO. And that is complicated by another fact, that by 2050 there will be 1 million more persons here in the United States than there are now. And there will be an associated energy demand with that, particularly in the residential and commercial sectors.

Understanding, as we do, some of these parameters, I think the problem becomes, then, what an artificial restriction of coal does to our domestic energy picture.

Now, assuming, for a second, that nuclear power isn't quite up and running. The siting, permitting, and waste-disposal issues haven't been worked out yet. And assuming that renewables haven't reached the point where they can address that demand. Well, that leaves natural gas. The problem with natural gas is, No. 1, the EIA estimated that our domestic supplies of natural gas, which are 3 percent of the world's proven reserves, are not going to be enough simply to supply the needs of the lower 48 States. Well, then, where do we get our natural gas from? Well, 58 percent of the world's reserves are controlled by Russia, Iran, Qatar, and then, our good friend to the south, Venezuela, holds another chunk of that.

If we are forced to rely on LNG from abroad, I think, again, that puts us in a very bad fix, but especially because we are competing with China, which is gobbling up petroleum left and right. So, I think that a pretty good preview of things to come, Senator, was something that happened, I believe, in—it was either December of January, where there was a deal brokered by a Massachusetts congressman with Citgo, the Venezuelan petroleum company, to supply natural gas to the State of Massachusetts. Now, I don't think we want to be there—as a Nation, I don't think we want to be dependent on foreign supplies. In fact, I think we want to enhance our domestic supplies. And I think we can do that through clean, coal-based electric generation and coal-to-liquids technology. And I think that once we realize those technologies, we will be, I think, better poised for our energy demands.

The CHAIRMAN. Yes, David?

Mr. DONIGER. Thank you, Senator.

This doesn't have to be an issue of whether we're going to use more or less coal, or more or less of any fuel. It should be an issue of whether we're going to use those fuels with more or less emissions. And the future of coal is going to be sturdier if we get to very low carbon-emitting coal plants, like IGCC with carbon disposal, than if we're continuing with our only choice to be to build conventional coal plants and drive the climate problem to disaster.

So, that is where we have a huge opportunity, first, from having the price signals that come from a carbon cap, and, second, from using a good, solid chunk—we recommend at least a quarter—of the allowances to go to power companies and others, for example, who are prepared to build the IGCC plants with the carbon storage, and move that along a lot faster. That's going to be good for the coal industry, as well as for the stable future of the electric industry. That's the formula for getting out of this tradeoff between more coal and more emissions.

The CHAIRMAN. That's true. The problem is that you can't get them built.

Let's move over here. We had some questions. Let's take Michael Morris.

Mr. MORRIS. Thanks again, Senator.

Let me try to address that issue. I think it's very important that if we have a mandatory cap, that new coal technology with the in-

egrated gas combined-cycle implementation and ultimate carbon capture and sequestration will work for the new coal activities. But let's not forget, on the energy demand cycle that you spoke of earlier, not only the growth that we'll see between now and 2030, but the physical ability to satisfy demand today requires that we keep as many of the current coal fleet plants online that we can. And the retrofit technology that we're working on through EPRI and other activities are heading in the appropriate direction, but, to date, a very expensive, and, most importantly, a very parasitic amine technology takes about 30 percent of the energy production capacity away from a plant. So, if you had 1,000 megawatts, and you retrofit with amine, and you're down to 700 megawatts, you've exacerbated, rather than helped, your situation.

With the new ammonia technology that EPRI is working on, the parasitic impact is only 10 percent, and that may be a way, as that technology continues to develop, that we can do retrofit.

So, I have no disagreement with David and the comments that he makes, but we need to make certain we have adequate energy to grow the economy of today, let alone the economy of 2030 and 2050.

The CHAIRMAN. Right.

Mr. MORRIS. So, we have to have those plants in the—

The CHAIRMAN. Right. Fred.

Mr. KRUPP. Michael, I'm an American, and I completely agree with you, we need to have energy. We need to have low-cost energy. But there are some retrofit technologies that are available today that are pretty cheap. I was in Kansas not long ago and saw farmers that, together, own a million acres of land, the Agri-Mark group of farmers. And they are able to sequester carbon, about three-quarters of a ton per acre per year for 25 years. And I think they'd be willing to sell those offsets—I know they would—for quite a modest price.

This brings me to the fact, we need a robust future for coal in this country. There's no question, we've got a lot of it. We have to be able to burn it. But one thing that's really important as you go forward and mark up a bill is, let's make sure there's a robust opportunity for these farmers, who can change their practices and provide a retrofit technology today, for the burning that's happening today, for very cheap—let's make sure that those offsets are robustly available in the bill.

Mr. MORRIS. Excuse me, Senator, I just want to make sure—that's not a retrofit technology. That is an offset. And we do that through the Chicago Climate Exchange. A number of operating utilities are doing just that, creating credits with better farming technology. We totally support that. We think that's an excellent idea.

The CHAIRMAN. I think we're going to get way off base here and have just a general discussion, an argument, about this. The truth of the matter is, the utility companies—utility companies do know, Fred, what's available for their industry, and they aren't going to come here before us and tell us something that's not so. They know about the farmers, but that doesn't help what the problem is described that they have. Farmers—is a great thing that's occurring, and we're proud of it, but it doesn't solve the fact they need a bill

to move 1,000 megawatt plants, and they've described the dilemma they've got.

Mr. KRUPP. But, in terms of today's capacity, if you set a modest limit, it would allow them to continue to operate the plants, at very modest costs.

The CHAIRMAN. Yes.

All right. Now, we're going to move right along here, Senator Bingaman, unless you have something urgent. You can have a couple, and then we'll—

Senator BINGAMAN. I have one question, and it's not urgent, but I would ask it, if we've got time.

David, let me ask your view on this whole issue of offsets. I mean, what are appropriate offsets? There's a lot of talk, a lot written in these responses to our white paper about offsets outside the cap. What do you think is an appropriate offset to allow, and what do you think is not?

Mr. DONIGER. Thank you, Senator.

First, in the draft bill that you have developed, you've proposed—and we think this is a good idea—that a slice of the allowances should be dedicated to—as a reward for offset activities, such as Fred described, and encourage those activities with a slice of the allowances from within the cap. Where we get concerned is with the idea that offsets would coin new allowances beyond the cap, because the prior experiences that we've had with this—and this goes back almost 30 years, through several different variations of the Clean Air Act—is that it's very, very difficult to ensure that offsets are really additional to what would have happened anyway.

We've seen, in the Energy Policy Act's 1605(b) Program that electric utilities, in particular, have registered with DOE millions of tons of supposed reductions that really represent no difference in the business-as-usual activity. And sorting out the rules for how you would tell what's a valid offset has been an impenetrable problem. But funding them from within the cap means that the environmental cap is maintained, and we support that. We think that's a great way to get incentives to the farmers for biofuels and for soil sequestration and so forth.

But there is also a bit of a dilemma here. We rely on the market signal from the cap to generate incentives for innovation to drive new technologies. On the other hand, if there's unlimited offsets, and you have a near-zero price of carbon, where was the incentive to develop new technologies?

Senator BINGAMAN. Let me just do one follow-up and ask, Michael Morris referred to the Chicago Climate Exchange—they have a system for permitting offsets and verifying offsets. How, in your view, does that work, if you're familiar with that? Is that designed in a way that you think makes sense, or not?

Mr. DONIGER. Well, I don't want to speak to all the rules that the Chicago Climate Exchange uses, but I do believe that if you tried to scale up what they're doing from—when you're dealing with pilot programs, you can give the kind of care and attention that it takes to vet these offsets, but when you try to mass produce them on a big scale, especially when both the providers and the potential users have an interest in the largest number of offsets at the lowest possible price, you end up with a quality-control pro-

gram—problem. You end up with it being very difficult to ensure that the offsets are really all they're cracked up to be.

And the international treaty, the CDM, which you heard about earlier, they're really struggling with that, because they have a international board to try to vet the quality of the offsets, and there's lots of complaints about bottlenecks, "Why are you scrutinizing this? Just let me go, let me have this, let's get going." And the quality starts to go down as the volume goes up.

So, we don't have a great solution to that, but keeping things within from—the reward coming from within the cap puts a discipline on this that would really help ensure that quality and keep the numbers from going out of control.

Mr. MORRIS. Senator, if I just might add, because we're one of the founding members of the CCX, it is an audited event. For a farmer to say he's created 1,000 credits, that activity actually gets audited to ensure that they're real. I couldn't agree with David more, no one wants to create credits out of whole cloth. And the utility industry has not done that. I think he made that statement. That's just absolutely wrong. And, to Senator Domenici's comment earlier, to what purpose would we do that, to be hammered for doing something that's wrong? Not going to happen.

So, the larger the program gets, the more difficult the audit is to make sure that someone who says, "I've got a credit"—because he's gonna be paid for that—and we're not going to send them money unless we're sure that there's a real credit that's been created. And having it above or below a cap is immaterial as to its reality. So, I think the logic is missing in David's comments.

Thank you.

Mr. KRUPP. Mr. Chairman, might I just mention one thing, constructively, that you all could do, even before you mark up a bill, and that would be to direct the Federal agencies to come up with standards, both for geological sequestration, where there are similar problems, that things can leak, as well as for agricultural and forest offsets. I think that could be done right away, and that would be terrific.

I, for one, hope that this problem is so big that if there's the potential—the greenhouse gas problem is so big that if there's the potential for cheap carbon credits by allowing farmers and foresters to play, that will let them play and make sure, of course, that the credits have integrity—by one study, as much as 146 million metric tons are available in our agricultural industry, enough to get us a third of the way back to 1990 levels, if we just set up the cap and write the rules. That's very promising.

The CHAIRMAN. I know we're supposed to be finished, but, you know, what Senator Bingaman and I have been toying with is a proposal that has a safety valve in it. And some of you have commented that you didn't think the concept was a very good idea. Now, if you did think it was a good idea, don't comment now.

[Laughter.]

The CHAIRMAN. We don't need no more of that. But for any of you who didn't think it's a good idea, or don't, you can have a couple of minutes here to tell us why. So, we're going to do that, if you put up your hands.

Mr. MONTESANO. Mr. Chairman?

The CHAIRMAN. Yes?

Mr. MONTESANO. The one problem that the National Mining Association has with the idea of a safety valve is that it's part of a larger compliance problem with mandatory bills that eat into funding that would otherwise be used by companies to conduct research and development. And a healthy economy is one that's actually going to lower emissions more than an unhealthy economy. And we think that safety valve as part of a bureaucratic—part of a compliance regime, would be problematic for us to work with.

The CHAIRMAN. I don't get it. I don't get what you're saying. Can you try it again?

Mr. MONTESANO. If companies are paying—you know, basically paying for compliance costs, and the costs of meeting, you know, the standards set forth in a mandatory problem, that's money that they can't use otherwise for R&D. I think that's the problem that we have with it.

The CHAIRMAN. Well, a safety valve doesn't say anything about that. It says that, at some point, after you've done that, if it isn't working, we'd cut it off.

Mr. MONTESANO. Well, the safety valve also—remember that EIA did a study on the safety valve, and the safety valve drastically increases in prices over the years.

The CHAIRMAN. Fred—David?

Mr. DONIGER. Senator, I appreciate your asking this question. There's two cost-control issues that I think a safety valve is intended to deal with. One is the instability in prices, the chance that you'll have a price spike, unexpected problems, in the short term, that would—sorry.

The CHAIRMAN. Hold it a second.

Mr. DONIGER. Yeah.

The CHAIRMAN. Okay, thank you. Thank you. Go ahead.

Mr. DONIGER. If I may, there's two cost issues that I think the recommendation for a safety valve is trying to deal with. One is the instability in prices. It could spike up and down, not be stable. Short term problem.

The CHAIRMAN. Right.

Mr. DONIGER. The other problem is a sort of long-run issue. If you knew what the price was, it still might go up, or it might go down, depending upon how technology develops.

Well, the first problem seems to be, really, the dominant one. People react to price spikes. If you had a long-term carbon cap, such as we were suggesting there, then you could have both banking, which is already built into your program—people do things early, as a hedge against future price spikes—and borrowing, which would allow them to do things late, as a way of dealing with price spikes. If you had banking and borrowing, you would not have price spikes. You would have a long-term stable price. It would be affected by what the real cost is of meeting the cap.

And so, what we're proposing is that you consider using borrowing as the main cost-control tool, and the safety valve becomes a trigger for Congress thinking, every 5 years or 10 years, "Is this thing—in light of the science, in light of international cooperation, and in light of the costs, is this thing too weak or too strong?" and use the periodic review, informed by the prices, to decide what you

should do. But don't have an automatic safety valve that breaks the cap.

The CHAIRMAN. Okay. Now, Craig, you have the luxury of playing the chairman. See, if you were me, you could have said, to me, "You don't get it"—

[Laughter.]

The CHAIRMAN [continuing]. Instead of the reverse, because I didn't get it. I got it now. And I thank you for your answer.

Okay. I understand. We're going to go on now to the next group. Thank you, everybody. It's been a great session.

[Recess from 3:40 to 3:47.]

The CHAIRMAN. All right. Are we ready to start? One, two, three, four, five. Is that right? Six.

All right. This is our fourth panel. And we are pleased to have you.

This is the Trading and International Competitiveness Panel, and they're responding predominantly, as I understand it, to questions 3 and 4 of the white paper. That is, "Linking and Developing Country Action," correct? Should a U.S. system be designed to eventually allow for trading with other greenhouse gas cap-and-trade systems around the world, as Canadian Large Final Emitter system or European Union? And, question 4, if a key element of the proposed U.S. system is to encourage comparable action by other nations that are major trading partners and key contributors, should the design concepts in the NCEP plan, to take some action and then make further steps contingent on a review of what these other nations do, be part of the mandatory market-based program? And, if so, how?

American Electric Power, Michael Morris, you're first.

STATEMENT OF MICHAEL MORRIS, CHAIRMAN OF THE BOARD, PRESIDENT, AND CHIEF EXECUTIVE OFFICER, AMERICAN ELECTRIC POWER

Mr. MORRIS. Thank you very much, Senator. And since I was on the last panel, I won't have to thank you for the chance to be here, but I'll do that anyway.

I want to specifically—because I know that the 2-minute warning will get to us in a hurry, talk specifically to the questions.

As to question 3, we absolutely believe that it should ultimately be linked to other trading programs on an international basis, as well as a much broader and more flexible creation of potential credits. The farming things that we just heard about, a panel ago, would apply to any country that is dedicated to agriculture. So, creating credits in other environments and using those as part of an international trading platform, I think would be an excellent way to go on that question.

As to the other, developing nations being involved, it's essential. If you truly believe that the goal here is control of the greenhouse gas growth worldwide, then you have to have the world involved in it. And if we don't do that, we find ourselves in very awkward positions. We believe very strongly in that. However, we do not believe in the current paper concept of having a two-tier, "We'll get started, and if they come along, great; but, if they don't, then Congress will reconsider and throttle back." I've lived through some of

that, and the likelihood of that happening is probably very, very small.

So, I would go into the program either with an absolute commitment, like the Byrd-Hagel undertaking of some years ago, and, if not that approach, at least set up an automatic ratchet down if the other countries don't act in the way that they are committed to or the way that we would hope that they would.

Short of that, I think what we'll find is a period of time when, in fact, America is doing the things that it's committed to do, and others are not, with the associated economic impact that that would have on the manufacturing base of this country, when our manufacturing competitors are just, willy-nilly, going on their way. So, I would think automatic, rather than reconvene, reconsider—that would be a good way to go.

Thank you very much for your time.

The CHAIRMAN. Thank you very much.

Michael.

**STATEMENT OF MICHAEL WALSH, SENIOR VICE PRESIDENT,
CHICAGO CLIMATE EXCHANGE**

Dr. WALSH. Thank you, Senator.

If Congress considers it appropriate to pursue legislation in this area, we think that you're going to want to ask the following question, what really works out in the field? And, since 2003, the members of the Chicago Climate Exchange have formed not only the first North American market, but the first international greenhouse gas reduction and trading program, that includes all six gases, agricultural and forestry offsets. And, indeed, this market, if—as a country, would be the second largest emission group under cap-and-trade in the world. It's a diverse market. And the good news is, it works, and it works well, now, on an international basis.

Now, we've brought to the design of this program a lot of hands-on experience, a couple of decades of experience working with these markets, SO₂ auctions we administered, and so on. We also operate the largest carbon trading system in Europe, the European Climate Exchange. And that is another dimension of the international market that's in place now.

CCX members take a legally binding commitment to cut absolute emissions 4 percent over 4 years, 6 percent by 2010. They use standardized rules to measure and qualify emissions, all subject to independent audit. It's a comprehensive rules system involving a registry, a trading platform, and predefined project-based domestic and international offsets for agriculture, methane, and forestry. So, the international links are in place now.

We've got about 140 very diverse members, but my input today really reflects the views of the exchange, and not those members, members such as Ford and DuPont, American Electric Power, Baxter, Tampa Electric, Waste Management, Rolls Royce, International Paper, IBM, many international companies. We've got cities, like Chicago, Oakland, and Portland. The State of New Mexico, the first State to take the commitment to reduce its own emissions, taking that leadership action.

The Iowa Farm Bureau is, right now, aggregating hundreds of thousands of acres of farm—and selling the credits as a new crop in the market. So, it's working now.

Let me close with some key lessons that we think are useful for informing any policy discussion.

First, learn from proven methods. Use existing measurement and verification protocols, and don't reinvent the wheel.

Second, keep it simple. We asked all of our members to simply take a 4 percent emission cut. Why define major winners and losers?

Third, standardized offset rules work, and can work in the international context.

Fourth, the market should, and can, define and credit early emission reductions. The market concept works now. We should build international linkages, from the outset.

And I look forward to discussing some ideas for making that happen in the open discussion.

Thank you, Senator.

The CHAIRMAN. Now, yours is voluntary.

Dr. WALSH. Voluntary, but legally binding. They sign a——

The CHAIRMAN. Oh, you have——

Dr. WALSH [continuing]. Contract once they join the exchange. That's correct, Senator.

The CHAIRMAN. Yeah.

Now we're going to take Rafe.

STATEMENT OF RAFE POMERANCE, CHAIRMAN, CLIMATE POLICY CENTER

Mr. POMERANCE. Thank you, Senator. And thank you for holding this conference to elucidate the debate——

The CHAIRMAN. You're welcome.

Mr. POMERANCE [continuing]. And your structure, hopefully, of a real mandatory system.

I want to answer the questions 3 and 4 in the context of an overall program. And, briefly, what I believe, and the Climate Policy Center believes, that that program should be economywide to capture all emissions and level the playing field. Second, it should be upstream-regulated—the point of regulation should be upstream, for simplicity. Third, there must be a safety valve to protect the economy. Fourth, there should be linkages in this program to actions by key developing countries to ensure global progress. And, fifth, and finally, there should be wise use of allowances for a number of different purposes; not just compensatory purposes, but purposes of solving the climate problem and protecting the treasury.

Now, having said that, a number of these elements were present in the Bingaman amendment of last year, and in the Udall-Petri bill that was introduced in the House last week.

On question 3, should we design the system to be compatible? At this time, my answer is no. The Kyoto Protocol, of which I was a negotiator, is quite different than the system that I advocated, in terms of an overall program. And, in particular, the safety valve makes them incompatible. And the other part I'd just say is that, if that were to happen, it would require, I would sense, an enor-

mous amount of international negotiations to make it work. But it doesn't—they're actually literally incompatible in important ways.

On the developing-country linkage, the answer is, yes, that a first step by the United States, with a safety valve, with an escalator, that escalator could be linked to ensuring that it would rise at a certain rate, but only if developing-country actions in key developing countries passed the test by the executive branch. In other words, we would create an incentive for China and India to take comparable actions, by saying, "We will take the first step, but we'll only go so far, unless you respond." And it's possible, in fact, to use some of the allowances to help them make the changes that are required.

Did I hit 2 minutes? Thank you.

The CHAIRMAN. Fine. You did very good.

Mr. POMERANCE. Thank you.

The CHAIRMAN. Richard.

STATEMENT OF RICHARD ROSENZWEIG, CHIEF OPERATING OFFICER, MEMBER OF INTERNATIONAL CLIMATE CHANGE PARTNER, NATSOURCE

Mr. ROSENZWEIG. Thank you, Senator. Thank you, Senator Bingaman, Chairman Domenici.

In addressing questions 3 and 4, very briefly, 2 minutes—I've never been limited to 2 minutes before, so I'll talk fast.

With respect to linkage, we would think that you'd want to create the opportunities to develop a program which has opportunities for linkage. And it's for a very simple reason. You want entities to be able to buy, sell, trade with each other. It's the comparative advantage of trade. The more sources that are participating, and the more opportunities there are, the more it will drive down costs and facilitate reductions in environmental activities.

This is no different than the reason for an economywide program—to bring transport into an economywide program, as opposed to just regulating a couple of sectors. You have those economic benefits.

There are several issues that have to be considered in doing this. The cost cap is one. It can have a perverse effect with respect to potential arbitrage opportunities across boundaries. It's going to have to be considered.

Second, compliance instruments. All the various legislation allowed different types of instruments to be used by regulated entities for compliance. This, once again, creates opportunities for different types of activities that may or may not be what a country had in mind.

Last, we'll call it comparability of effort. Some governments just simply are not going to allow linkage with a country who they—whose target is far less stringent. They are not going to want to allow that government's regulated firms to be sellers in such a market.

The other types of linkage with respect to developing countries. Right now, that's being done through the project-based mechanisms. The United States can do one of three things. I can, sort of, allow U.S. firms to buy certified emission reductions, which—according to the international standards, or, I think, to actually play

a leadership role in this area, there is an opportunity for the United States to create new standards for domestic offsets that can actually inform the debate post-2012, in the first commitment period of the Kyoto Protocol.

Thank you.

The CHAIRMAN. Thank you.

Eileen.

STATEMENT OF EILEEN CLAUSSEN, PRESIDENT, PEW CENTER

Ms. CLAUSSEN. Thank you, Senator Domenici, Senator Bingaman.

I'd like to address the issue of the comparability of national efforts by disentangling two distinct, but related, objectives. First, achieving adequate action by all major emitting countries, and, second, protecting U.S. firms against competitive impacts.

The first of these objectives is best achieved through multilateral commitments, engaging all the major greenhouse gas-emitting nations in a fair and effective long-term effort. Twenty-five countries account for 83 percent of global emissions. Engaging these major economies requires a flexible framework that allows different countries to take on different types of binding commitments. We believe the United States should play a leadership role in developing such a framework.

But ensuring broad comparability at the national level will not necessarily achieve the second objective, protecting U.S. firms against competitiveness impacts. It's not the competitiveness of the U.S. economy as a whole that is at issue. To the degree that there are competitiveness impacts, they will fall on specific sectors, energy-intensive industries whose goods are traded internationally. These sectors might remain vulnerable, even if efforts by all major emitters are broadly comparable, because countries could choose to exempt a given sector from controls, giving that sector an advantage over the foreign competition.

At the international level, one way to ensure a level playing field is to establish multilateral agreements along sectoral lines. These could be one element of a flexible framework.

At the domestic level, in designing a national cap-and-trade system, we should set the caps at modest levels, allow offsets, and grandfather allowances in a way that protects vulnerable firms or sectors. We could also dedicate funds, possibly by auctioning a portion of allowances, to provide technology assistance to affected industries and transition assistance for their workers.

Let me just say, in closing, that the single most important step the United States can take to encourage stronger efforts by other countries is to begin in earnest to address our own greenhouse gas emissions.

Thank you very much.

The CHAIRMAN. Thank you very much, ma'am.

Jonathan.

STATEMENT OF JONATHAN PERSHING, DIRECTOR, CLIMATE, ENERGY, AND POLLUTION PROGRAM, WORLD RESOURCES INSTITUTE

Dr. PERSHING. Thanks very much, Senators. It's a pleasure to be here.

My name is Jonathan Pershing, and I am the director of the Climate, Energy, and Pollution Program at the World Resources Institute, which is a nonpartisan research and policy think tank here in Washington.

I think that this discussion in the conference, and the effort, is at a critical time. Science is clearly telling us that action is urgent if we're to forestall the climate problem.

I'd like to make several points based on our submission and the analysis that we've done.

The first, we can learn a lot from existing programs. We have a series of U.S. programs—the SO_x, the NO_x program, now the RGGI program; we have the CCX program. We also happen to have the advantage of the EU program, and those lessons are ones that apply here, even though they have somewhat different circumstances.

On the international side, clearly international action has got to happen. According to the U.S. Energy Information Administration, in 25 years from now, in absolute terms, the United States is going to have more growth in its emissions than India, Russia, Korea, Mexico, and Brazil, combined. And it'll be about the same time as—size as China, which has four times our population. So, to give you some sense of scale, it's quite critical. But we can't just, therefore, wait for them to act. We're 20 percent of the problem. We've got to act, ourselves. And the issue of the technology drivers that you can create become a central part of the future. If this is a technology program, as this morning's panel indicated, we clearly need to move that forward. And others are ahead of us in that curve.

I'd like to make a brief point about linking. In principle, it's very desirable. The economics of markets means that the more countries and the more players we have, the lower the price is going to be. But not all markets are legally and equally robust. We need to have institutional integrity. That means systems where compliance rules are strong, trustworthy, where reporting is open and transparent, and monitoring and verifications assured. That may not apply to all developing countries, if any. And we should not be bound by that.

And, finally, if I say that we need to have China and India in, that's quite clear. But it does not mean they need to do the exact same thing that we do. Something different might reasonably apply. It may not be a market in trading, it may be a system of offsets for project-based activities that we can look to.

Thank you.

The CHAIRMAN. Thank you very much.

Senator Bingaman.

Senator BINGAMAN. Well, thank you all very much. Very interesting testimony.

Let me ask Michael Walsh, first, and maybe then Michael Morris. You folks have been doing this for about 2 or 3 years now—3 years, right?

Dr. WALSH. Almost 4, sir.

Senator BINGAMAN. Nearly 4 years. And you have in place a legally binding system, which you believe is reducing greenhouse gas emissions—as having the effect of reducing greenhouse gas emissions that would otherwise be produced by your members. And the AEP is a member, as I understand.

What would be wrong—as at least a theoretical basis—what would be wrong with just taking what you have come up with, by way of requirements for your members, and essentially mandating that everybody in the country comply with those?

Dr. WALSH. Well, to be clear, Senator, it's not that we believe the emissions are down. The independent audit body, NASD, which is a congressionally sanctioned entity, has verified to us that emissions are down faster than we have required under our commitments. And at very modest cost, I might add. So, these are audited, and those numbers are adjusted for dispositions of facilities. So that, on a real basis, these emissions are, in fact, down.

Senator, it's up to our elected officials to determine whether it's appropriate to apply that structure. It's a very conservative structure. We don't give out as many credits to farmers, as some people have quoted in the numbers today. We discount our offsets quite frequently, to be extremely careful. Maybe we could be a little bit more liberal. We have some safety valves in the system that may not be appropriate for a national policy. But, by and large, we strived, with our many members who helped us to design this, to have a functioning system that is a respectable and credible and serious audited system. So, we think it may offer useful insights for policymakers here and around the world. I want to emphasize, we had members from Brazil sign a legally binding contract to reduce emissions, members from Canada, members from other countries.

Senator BINGAMAN. Well, let me ask a, sort of, follow-up. The cost of a permit to emit a ton of carbon in your system is about \$2.50, right?

Dr. WALSH. Yesterday's close was about \$3, so a farmer in the Midwest is getting about \$1.50 an acre per year in his new environmental service crop.

Senator BINGAMAN. Okay. Now, the cost in Europe to emit a ton, on the European Exchange, is about \$30.

Dr. WALSH. That's correct.

Senator BINGAMAN. What would the cost—of course, there are many differences. One obvious difference is that in Europe, their system is mandatory. It applies to a specific segment of the economy. What would be the cost—what would happen to the cost of a permit to emit a ton of carbon in your system, with your requirements, if it were mandatory for everyone in the country?

Dr. WALSH. Well, as an exchange official, Senator, you probably can understand I really can't make a conjectural remark about where price might go. We have many—

Mr. MORRIS. Sarbanes-Oxley?

Dr. WALSH [continuing]. We have many professional marketmakers and entities that have a position in the exchange. It would be a function of, does new supply in the market come in faster than new demand? And we have opened the market to all

six greenhouse gases, so that IBM or Waste Management can cut fluorocarbons and methane at very low cost. And as we—if we saw a signal towards a bigger market, instead of having half a million acres of farmland enrolled now, we might be out in Curry County getting all kinds of ranchers and grazing land enrolled, as well, and landfills in Las Cruces, as credit suppliers. Many people were hesitant to get involved in the market, on the sell and the buy side, until they saw that it was working. So, it's impossible to say, and I couldn't. Even if I had a hunch, I wouldn't be able to reveal it to you, sir.

Mr. MORRIS. Senator, if I might just add to your question, because I think it's an important one, the fact of the matter is, the Chicago Climate Exchange is voluntary, and that's the appeal to people like Ford, IBM, DuPont, and American Electric Power, and others. And it does work. The notion—to Senator Domenici's question earlier, you volunteer to get involved, but, once involved, you've signed a legally binding contract that, if you fail to live up to, you're in violation of the NASD standards, and you'll be on the—you know, above the fold in the *Wall Street Journal* for being someone who did a fraudulent activity. So, it has with it the beauty of the integrity.

And, to the point that was asked in the earlier panel, about the auditing of the actual creation of the credit, very important. If you took your program and made it nationwide, it would work. I know it would work. The price, unknown. If we had allocation of credits, because that would be part of the way you'd create it, we would surely step up into the \$8 or \$9 or \$10 a ton. If you put your safety valve in, that might work to suppress that price as we go forward.

But what American Electric Power stands for, and, I think, what we all hope, is that voluntary actions will really lead this country in the right direction. The Asia-Pacific activity that we did in Australia—I happened to be there when we did it—China and India were there trying to learn from us and others, from Japan or from Korea and from Australia, what they're doing, how—what we're doing to control greenhouse gas emissions. And those are the kinds of things—

So, mandatory, without those huge emitters in the game, takes the American economy and puts a real damper on it, going forward. And, again, we need to have them in a Reagan-like “trust and verify” program. And if we're going to have that, “we start first,” it has to be an automatic step down if they don't live up to their end of the goal, or we'll be, again, economically behind the eight ball. But, your idea would work, I'm certain of it.

The CHAIRMAN. Now, let's move over and ask some of you.

I'm constantly amazed to read the views of people that say, “If we'll just do something, Chinese will do something.” And the other day I read a very long dissertation about China, in which they said the very opposite, just—they took the position in—exactly the opposite of that. Can any of the four of you just talk to me a little bit about—let's just take China. It's clear that China is a controlled environment, in terms of economics. They decide they're going to buy nuclear powerplants, they place an order for 20, right? No horsing around. They figure how many new powerplants they need, and they say this, and they tell somebody, “Locate 'em, and build

'em," right? "We don't care how dirty it is, or what." So, I assume it's the same if they decided to change their mind on pollution. Would you agree, Rafe? They could fix it, and they—if they wanted to?

Mr. POMERANCE. I'd just give my view on this. Everyone has tried to predict what the Chinese or the Indians would do in the future on this problem. What is their behavior going to be? And their per-capita incomes are very low, so the usual answer is, "Not much," because they're unwilling to spend capital. Well, how do you answer the skeptics' question? The way we would—we certainly know that they're not going to act if we don't act. That would be pointless, just as we say it's pointless for us if they don't. We're much wealthier, we have the ability to act. So, what—how might we do this?

Our suggestion is, the United States takes the first step, but within that step is a review to examine what the Chinese have done in response. And if they don't measure up to the standard that we create, we don't go further. That would induce the possibility of a negotiation. I think that all governments—with what I understand about the climate system, the way it's going, all are going to be subject to incredible international pressure to act in some reasonable fashion as time goes on. And I include the Chinese. I was in—present in the—many meetings, and there are many domestic measures—I'm no expert—that the Chinese have taken, for their own reason, to date.

Thank you.

Mr. ROSENZWEIG. A couple of things. I think anyone who's looked at climate knows that you're not going to address the problem over 100 years without the Chinese, other large developing countries coming into the system. But I think it's important for the United States to, sort of, step back and, sort of, recognize what the Chinese, I'm sure, have said to all of my colleagues, former negotiators here, is that the developed world is responsible for about 80 percent of the concentrations in the atmosphere. So, that may warrant the United States taking the first step.

I'm just going to, sort of, take one other point here, which is, we did a lot of work with respect to metrics in evaluating countries' performance in dealing with climate change. And we developed a series of economic, environmental, and technological metrics in order to evaluate that. And we looked at four developing countries. We looked at China, India, Mexico, and Brazil, for obvious reasons, given their size. And so, I think to take this to write legislation that says, "The United States will look and then determine how to go forward," probably needs to be done in a fairly general way, because it's very complicated.

And here's the results of just looking at their environmental performance. China's performance, from the dataset we had, improved their emissions intensity by about 45 percent, I believe, over 10 or 15 years; their absolute emissions went way up. India's emissions intensity improved much less; their absolute emissions went way up. Mexico's emissions intensity improved; their absolute emissions went way up. Brazil, who probably has done more than all of these countries, from a climate perspective, emissions intensity did not

improve, because they have this little problem of having no water, so they use a lot more gas to generate power.

So, looking at metrics is an awfully difficult, complicated thing to do, and it's also important to note that the Chinese improvements were mostly based upon economic reforms, taking subsidies out of the economy, not addressing climate. So, as you look at metrics, I think it's important to, sort of, stay general.

The CHAIRMAN. Before you get rid of the mike, you would agree, however, would you not, that if they decided they wanted to—they are the kind of governance and economy that could just get it done?

Mr. ROSENZWEIG. I think there's going to be several ways that developing countries can play in this system. It's going to have to be determined through international negotiations.

The CHAIRMAN. Yes.

Mr. ROSENZWEIG. I think Jonathan's comments have that about right. But, yes, I think there are certainly things—

The CHAIRMAN. I'm not talking about negotiations, but just as a matter of—we have a harder time accomplishing it than them. That's why we're doing all of this.

Ms. CLAUSSEN. Yes.

The CHAIRMAN. They wouldn't have to have all these meetings, right?

[Laughter.]

Mr. ROSENZWEIG. They might be more efficient, from a governance perspective.

The CHAIRMAN. Well, they just tell somebody to do it, right?

Ms. CLAUSSEN. Yeah. I mean, if I could just make a couple of comments. We just completed a dialogue with 25 individuals from 15 countries with seven companies, so it was a real mix of people, to try to figure out what kind of arrangement we could have, post-2012, sort of after Kyoto was over, to, sort of, think ahead. And we had a couple of people there from China, also from India and Brazil, and a lot of American companies, and actually some Senate observers, as well. So, it was mixed group. And I think there was great willingness on the part of everyone to consider something, post-2012, that is broad, flexible, allows them to do different kinds of things, as long as they are meaningful and verifiable. And the Chinese were right there.

So, I really believe that if we were to try to do something ourselves, and then move forward we would find them willing to do some things that would also be meaningful.

The CHAIRMAN. Jonathan.

Dr. PERSHING. Just two additional points, perhaps, to add. The first one is, if one compares India and China—because those are the two that you frequently look at—I'd just take the example over the past 25 years in electrification. India currently has about 500 million people who do not have access to electricity. Twenty-five years ago, China had the same number. Today, still the same 500 million in India, only about 10 million in China.

The CHAIRMAN. Really?

Dr. PERSHING. So, you can get some sense about—as you—just very directly answering your questions, Could they do it? I believe they could do it. It doesn't necessarily mean that they would adopt a program the same as ours. It could mean that they do things for

reasons of energy security, which we clearly have as a priority, as well, that deal with things like transport efficiency. They have just done this massive push to gas, which is having the same size net reductions as the current combined offset projects around the world, one dash-to-gas in China. So, you see these fundamental opportunities that they could meet. So far, they have not. And, in fact, they have rejected the idea of adopting a trading program.

I would suggest that an area that you could support would be to push, for example, the State Department to be your interlocutor. You can get a judgment as to how effective or valid or valuable relative and comparable efforts have been.

The CHAIRMAN. Senator Bingaman.

Mr. ROSENZWEIG. China's also become the largest seller, as well, of project-based offsets in the world.

The CHAIRMAN. All right.

Mr. ROSENZWEIG. In one year, they have decided they wanted to do this, and they're, by far, the biggest seller.

The CHAIRMAN. Okay.

Senator BINGAMAN. Let me try to understand how the various permits or allowances—I guess the words are, sort of, used interchangeably in this process—but how these international markets would relate—those allowances that are generated in a system in this country that has a safety valve, how that would relate to what is generated in Europe, which has no safety valve, with what is generated on the Chicago Climate Exchange, which has no safety valve, how—I mean, if there were some kind of world market for allowances and permits, is it clear that there's a clearing mechanism for those different types of—and different-valued permits? Dr. Walsh, you're the expert on that.

Dr. WALSH. Well, you've got a lot of expertise here today, sir.

I just spent the weekend in Europe with a roomful of some of the very top energy and emissions traders throughout the continent, and they're eager to see U.S. leadership—in part, because they know that we would pursue a more flexible, six-gas—perhaps a little more comprehensive offset system than what the European system allows now. So, where we're going and how those markets will interface is difficult to predict.

Currently, the Chicago Climate Exchange accepts international credits from the Clean Development Mechanism and from the European Union allowance system. We are at a significant price differential. How that would pan out if we opened up our markets to international trade is difficult to predict. However, if we did see something like a \$7 or \$8 price gap in the United States, and the European demand was strong at \$30, clearly the credits would flow to that higher priced market. All else constant, whether it be business relationships or credit or payment worthiness issues, putting those aside, the markets would seek out the highest and best opportunity, one would expect, sir.

Senator BINGAMAN. Well, some of the discussion in the previous panel about capped—about offsets outside the cap—give me a little explanation as to how you see that. If each country has a separate cap, and offsets are being generated in China, you know, how does—that is meant by this concept of “outside the cap”? David Doniger was saying that he thought it was a big mistake to allow

offsets outside the cap. I think, Michael Morris, you were saying you thought wherever the improvement in the environment occurs, so much the better, there's no reason to limit that.

Dr. WALSH. Senator, let me preface my answer with the following observation. To a significant degree, the debate about offsets has become a bit of a tempest in a teapot. If we were to stack up the emission reductions realized by the Chicago Climate Exchange members, and stack 'em 50—they'd be a 50-foot-tall pile—only one foot of that would be offsets. Offsets do not come flowing in like Niagara Falls. We see that in the Clean Development Mechanism, which has a high price at the end of that rainbow. We see that in the Chicago Climate Exchange.

So, there's been a—frankly, a bit more debate than I think is worthy. One can clearly define, in a conservative, verifiable way, what an offset is. And if you provide those clear instructions, you still will see a relatively modest pace of uptake on offsets.

Now, that said, there is some view that if you were to call for a—say, a 4-percent cut in emissions, as CCX does, over 4 years, and were to allow in, let's say, up to one-fourth of that, 1 percent, as offsets, that, in fact, some view that you wouldn't really achieve the 4-percent cut, you would only achieve a 3-percent cut, because, well, those offsets are somehow—are new and different and extra. But we don't see it that way. If the cut occurs in Brazil or in China or in Canada, and it's verifiable, we think that's a cut.

So, I think there's some confusion on that issue, but a lot of folks have a different viewpoint on inside or outside the cap.

Senator BINGAMAN. So, you're saying that, "outside the cap," the 25 percent of the reduction that you would permit to come from offsets would be outside the cap? Is that the way you're understanding that term?

Dr. WALSH. The example I gave you was a scenario where 25 percent of the reductions—in fact, it's only—it's been less than—less than 5 percent of our reductions—25 percent of the reductions were occurring offsite, not at the smokestack of our members, but were occurring on farms and through forest growth or methane capture. I don't understand, Senator, why anybody would consider that not to be a desirable thing to have happen. These are win-win things that are both reducing carbon emissions and providing local environmental benefit. Some people think that that is not enough of a cut, or is not a valid contributor to progress. I would beg to differ.

Senator BINGAMAN. Yes, go ahead, Jonathan.

Dr. PERSHING. I think one of the big questions around the offsets market has been how robust they are. One of the issues that David Doniger raised earlier was that there is some suspicion that you can't accurately monitor and verify them. One of the approaches that's been taken in a number of markets as they develop is to try and create benchmarks. So, there's some standard that's set, and that's a standard that's universally applied. And if you do that, you have more likely integrity of all the market structures you're going forward with. And when you do that, you have more confidence in those market options. That has two effects. The first is, it maintains market integrity. The second, it allows you to look at those

offset benefits, probably anywhere in the world, that meet that benchmark. And that's got a huge economic value.

Senator BINGAMAN. Rafe.

Mr. POMERANCE. Just to try to elucidate this a bit more, I think that David Doniger made a proposal to use—if I recall correctly—use allowances to, in effect, buy offsets. In that case, you don't have to worry about their verifiability. They're just good projects. And they don't, sort of—they're not in the accounting of the cap. The outside-the-cap is, if a Nation has 100 units of allowable emissions, and it decides to buy ten units outside the country, through the Clean Development Mechanism, say, then its allowable domestic emissions would be 110. But there is a real question about—in many people's minds—about the verifiability of the offset. So, he's sort of—would—I believe, was taking an insurance approach to offsets, which is to use the value of the allowances to buy offsets.

Mr. ROSENZWEIG. I disagree with David. Offsets are good. I think it's important to step back and look at what they're trying to accomplish with a first stage of a climate program. And you want to encourage activities that may not occur without the incentive to do it.

The problem with offsets is the transactions costs, which basically do not allow developers to secure financing to develop their projects. There are several different ways that the world is learning to implement, to develop modern verification standards, and to ensure that they are real, verifiable reductions.

So, as a first step, we would, you know, disagree with David. We think that you can create offsets outside the cap that create a lot of beneficial activities. That would also work fairly well if you're going to go with a safety valve, that you would probably create a whole bunch of environmental activities that may not occur if there were not a safety valve.

So, I would, sort of, suggest that the two things play hand in hand.

Thank you.

The CHAIRMAN. I have no further questions.

Michael Walsh, I just wanted to indicate that my office will be calling to see if we can set up an appointment with either you or whomever, so you can come to the office and tell me more about the program, in detail, specifically, so I will understand it.

Dr. WALSH. We look forward to that opportunity, Senator.

The CHAIRMAN. I think it's important that I do that, and do that as soon as I can.

Now, with that—

Senator BINGAMAN. Mr. Chairman, I thought you—I thought you were going to volunteer to join the Chicago Climate Exchange, have your office join.

Dr. WALSH. Well, Senator, you should be aware that we have an open-door policy, not only to corporate emitters in Brazil and elsewhere, but to organizations like the World Resources Institute, that wanted to define and help us build the system and offset their own emissions. So, we've got the thought leaders, but we've also got the prayer leaders, from the Jesuits of Santa Clara, California, who are one of our original investors, and are also offsetting their members

in our exchange. So, you'll be in very blessed company if you want to become a member, sir.

[Laughter.]

The CHAIRMAN. I have not yet said I'd be a member, but you've given me a very good reason, with that new group——

[Laughter.]

Dr. WALSH. Thank you, Senator.

The CHAIRMAN [continuing]. There. I'm sure I'll be close to them quickly——

[Laughter.]

The CHAIRMAN [continuing]. What they do. Maybe I can act like them, right? In any event——

All right. Thank you, everybody. I notice a lot of your were patient, stayed a long time. A lot of coverage stayed the whole day. And we think it was beneficial to us. We will not deny that it was hard work for us, and for you, too. But our schedules are the things that make our lives tough. But for that, it would have been a very nice, fun day with all of you.

Thank you. We look forward to the compilation of this, and see what comes next. You all wait and see.

[Whereupon, at 4:28 p.m., the conference was adjourned.]